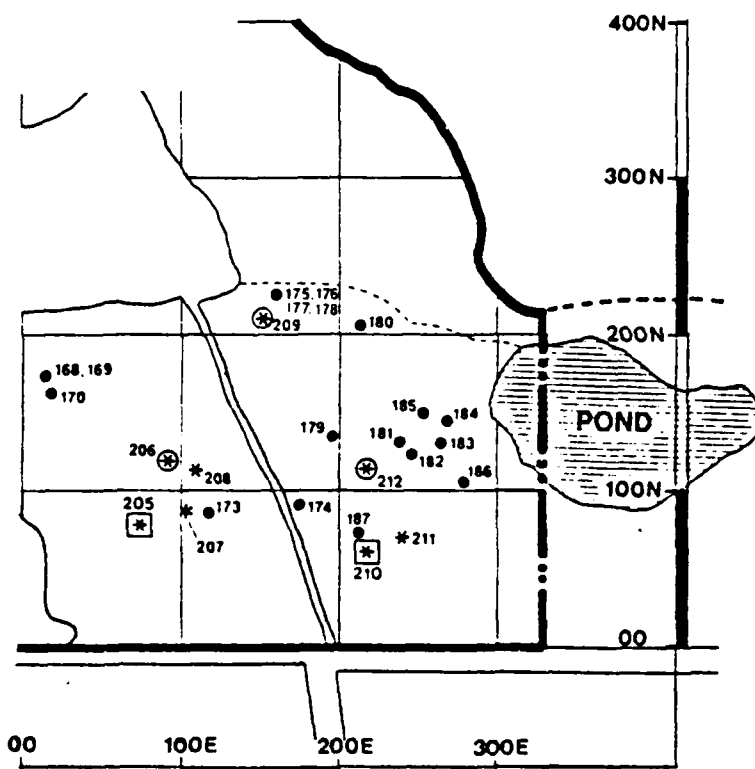
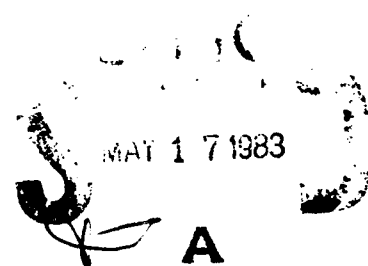


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CULTURAL RESOURCES SURVEY OF  
NEW DREDGED MATERIAL DISPOSAL SITES  
AT BARBERS POINT, O'AHU, HAWAII



AKI SINOTO  
DEPT. OF ANTHROPOLOGY  
NOVEMBER, 1979



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U.S. ARMY ENGINEER DIVISION, PACIFIC OCEAN  
CONTRACT NO. DACW84-77-C-0019

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CULTURAL RESOURCES SURVEY OF  
NEW DREDGED MATERIAL DISPOSAL SITES AT  
BARBERS POINT, O'AHU, HAWAI'I

by  
Aki Sinoto  
Department of Anthropology  
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Prepared for  
U.S. Army Engineer Division, Pacific Ocean  
Contract No. DACW84-77-C-0019

November 1979

Accession For

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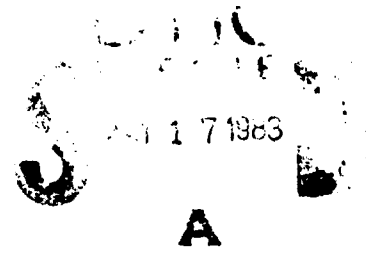
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### ABSTRACT

Since 1975, several archaeological programs, ranging from reconnaissance survey to salvage, have been undertaken as steps in mitigation of the adverse effects of planned construction activities for the Barbers Point Deep Draft Harbor in Honouliuli, 'Ewa, O'ahu Island. The most recently completed project, the Cultural Resources Survey of the New Dredged Material Disposal Sites, was designed to permit accurate estimates of further archaeological and paleontological work required in conformance with historic preservation laws and consisted of a locational survey of cultural sites, limited subsurface testing for determination of the extent of paleontological remains, and determination of the eligibility of these resources for inclusion in the National Register of Historic Places.

The study area is an 80-acre parcel adjoining the eastern boundary of the previously studied area. Fieldwork was conducted between February and March of 1979 by the Department of Anthropology, Bernice P. Bishop Museum, under contract with the U.S. Army Engineer Division, Pacific Ocean. Although Lewis (Ms.) surveyed the pond perimeters immediately to the east of the current project area in 1970, no previous work had been done within the boundaries of the project area.

The archaeological survey located and recorded 40 sites, representing a total of 12 major site types and 40 discrete features: *āhu* (stone mounds), 7; C-shape, 6; complex, 1; enclosure, 2; filled-paved area, 2; habitation sinkhole, 2; L-shapes, 1; modified depression, 1; modified sink, 8; platform, 3; remnant wall, 6; and U-shape, 1. No portable surface artifacts were recovered.

The paleontological survey identified and map-located 505 unmodified sinkholes, which probably compose only 25% of the total number of testable sinkholes present in the area. Due to the high number of sinkholes with possible paleontological significance, sink distribution was determined by a systematic locational survey (systematic quadrat sampling), and portions of 24 sinkholes were sampled for presence/absence determinations of fossil avifaunal remains. For the purpose of estimating sinkhole densities and to facilitate any subsequent phases of work, intensive locational mapping was completed for all testable (accessible) sinkholes within sampling areas of uniform size. Preliminary

sorting and analysis revealed that roughly 80% of the total sinkholes tested contained avifaunal remains. The preliminary results also show the occurrence of these remains to be evenly distributed throughout the survey area, although additional testing is required to reveal any potential areas of concentrated avifaunal deposition.

In general, the results of the current survey revealed a relatively low density of archaeological sites compared to the adjoining areas. However, to the degree discernible with the current level of investigation, there is no apparent hiatus between the previous study area and the current one. Also the conformity of site types and their spatial relationship to the previously studied area indicate that this area represents a continuous, perhaps marginal, portion of a larger complex that incorporates the other areas as well. With the exception of two wall remnants and several sinkholes that warrant no further work, the located sites appear to be eligible for nomination to the National Register based on the criteria that:

- (1) They appear likely to yield data important in understanding the prehistory of O'ahu and Hawai'i in general (Criterion d, CFR Part 60.6);
- (2) The current area is a continuation of the adjoining area, which is already eligible for National Register nomination.

Another important aspect of this new area is the frequency of both unmodified and modified sinkholes. Since one of the major questions posed for the Barbers Point area is the "possible association of the fossil birds with prehistoric man" (Sinoto Ms.b:7), the situation here affords excellent opportunity to address this problem. What is expressedly significant here is not the sites themselves, but the fact that the higher frequency of sinkholes increases the potential for recovery of data substantiating cultural significance of the paleontological remains. Although the cultural/paleontological association has not yet been demonstrated, if these sites are destroyed, the opportunity to intensively address this problem will also be lost.

In view of the planned dredged material disposal activities, which will encompass the majority of the project and adversely impact the cultural resources present by overlaying several meters of dredged debris, intensive data recovery or salvage of both archaeological and paleontological sites is recommended. This can probably be accomplished best by an initial program of

extensive subsurface testing followed by intensive excavations of selected sites contingent upon the test results.

With the planned alterations of major portions of not only the current project area, but the other areas as well, the destruction of the Barbers Point Archaeological Complex is imminent. Thus, accelerated implementation of more intensive investigations will no doubt contribute greatly to the understanding of the prehistory of this region as well as assuring a permanent record and a source of data for future research.

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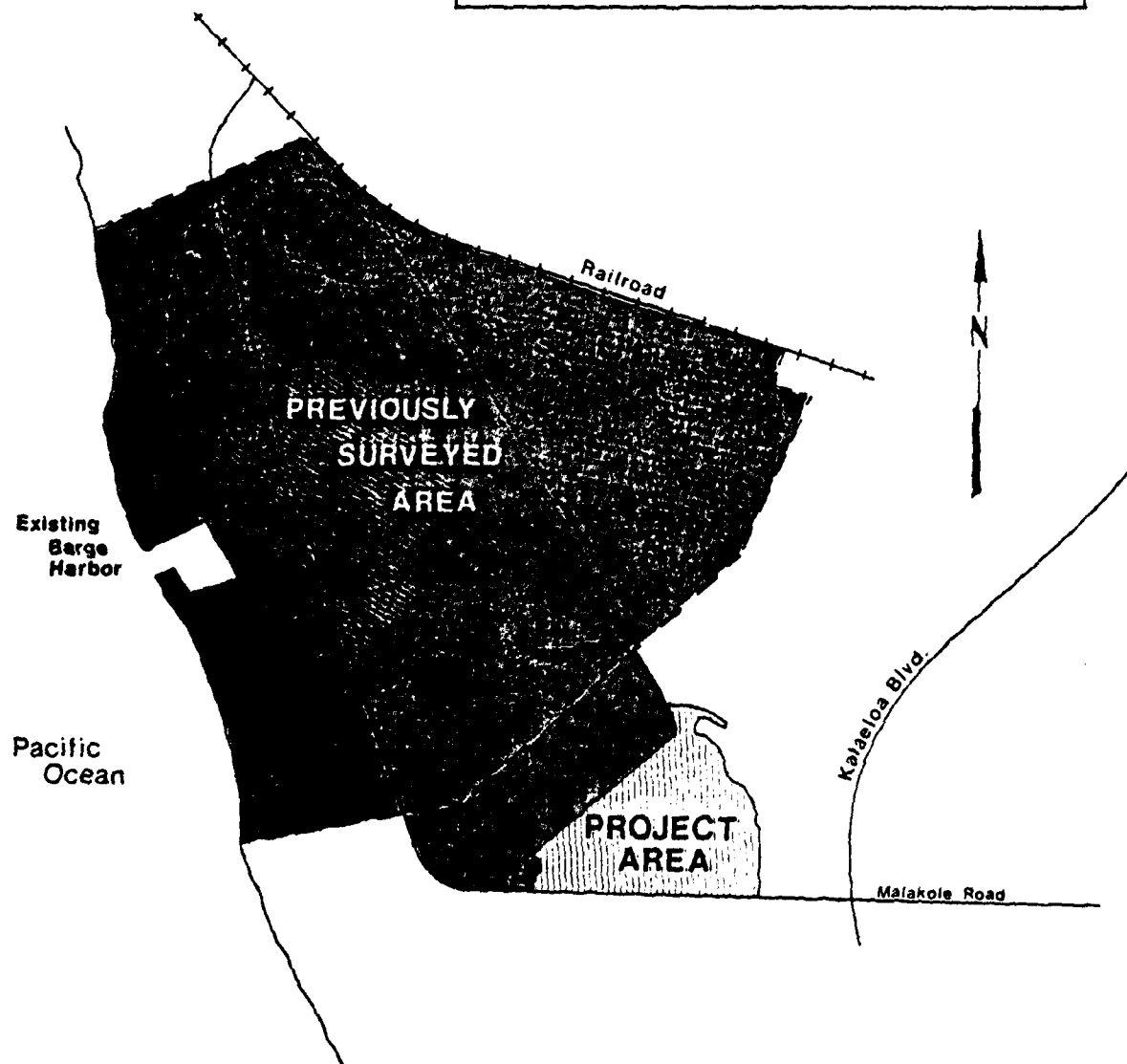
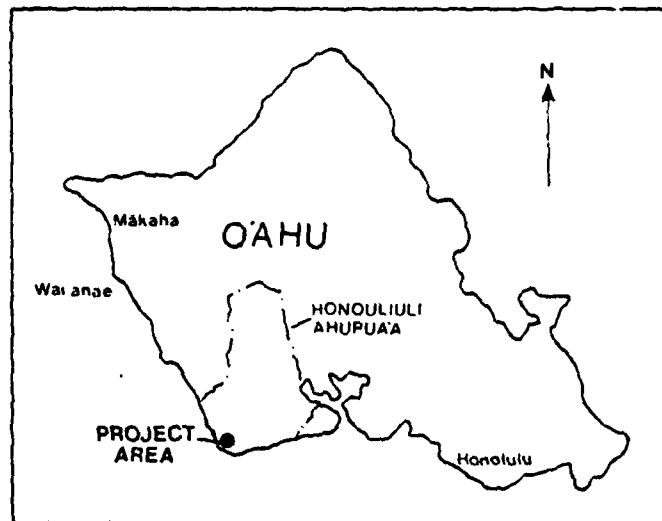
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Fig. 1



**BARBERS POINT SURVEY AREA  
HONOLULU, O'AHU  
March, 1979**

Fig. 1

## INTRODUCTION

During February and March 1979, the Department of Anthropology, Bernice P. Bishop Museum, conducted a cultural resources survey of a newly established Dredged Material Disposal Site for the Barbers Point Deep Draft Harbor. This work was done under contract (DACW84-77-C-0019; Mod. P00018) to the U.S. Army Engineer Division, Pacific Ocean.

### PREVIOUS RESEARCH

For a synopsis of archaeological investigations conducted at Barbers Point up to 1976, the reader is referred to the introductory section of "Archaeological and Paleontological Salvage at Barbers Point" (Sinoto Ms.b).

Since the completion of the salvage project conducted by the Bishop Museum in 1977, another archaeological survey was conducted by ARCH (Archaeological Research Center Hawai'i, Lāwa'i, Kaua'i) for the Water Transportation Facilities Division, Department of Transportation, State of Hawai'i. A brief comparative commentary of the ARCH and Bishop Museum reports is included in Appendix III of this report.

### DEFINITION OF PROJECT AREA

The project area is located in Campbell Industrial Park, at Barbers Point, Honouliuli *ahupua'a*, 'Ewa District, O'ahu Island. The current survey area consists of roughly 80 acres of land adjoining the eastern boundary of previously surveyed areas. It is defined on the south by the existing, paved Malakole Road, on the west by the eastern boundary established by the 1978 ARCH survey, on the north by existing cane fields and cane roads, and on the east by a N-S line at the western extremity of the pond (see Fig. 1).

Generally the topography is a flat karstic plain on a gentle seaward slope and is similar to the previously surveyed areas. The majority of the project area is heavily vegetated by trees, shrubs, low-lying weeds, and creepers. The dominant cover vegetation is *kiawe* (*Prosopis pallida*) and *koa haole* (*Leucaena glauca*).

Approximately 10% of the area has been totally altered and presently is used for industrial dumps and access roads. Evidence of less recent clearing and alteration was also observed throughout the survey area. The northern portion, constituting roughly 30% of the total area, appears to have been extensively cleared at one time, probably for ranching activities. This area is clearly demarked today by a heavy secondary growth of *koa haole*. Parallel bulldozer cuts traverse the project area and have partially or totally destroyed several sites. The origin and dates of these cuts are not known; however, an aerial photo taken in 1930 by the Army Air Corps (B.P.B.M. Photo Archives) shows the area to be unaltered, signifying post-1930 origins for the bulldozer cuts. The vegetation overgrowth and weathered condition of the substrate in these bulldozed areas suggest military or agricultural (sugar-cane, ranching) activity dating back a few decades.

For a more detailed description of the general environment of this region, the reader is referred to previous reports by Lewis (Ms.), Sinoto (Ms.a, Ms.b) and Davis & Griffin (Ms.).

#### MAJOR OBJECTIVES OF THE SURVEY

Paragraph 4g, "Mitigation," in the Department of the Army-Regulation No. 1105-2-460 document reads in part:

"The amelioration of losses of significant paleontological, scientific, prehistorical, historical, architectural or archaeological resources which will be accomplished through preplanned actions to preserve such resources or recover the data they contain by application of professional techniques and procedures..." [emphasis added].

The major objectives for the current survey were two-fold.

(1) On-the-ground locational survey and identification of all cultural features: (a) to permit the formulation of accurate assessments for further work that may be required to mitigate possible adverse effects of the planned development activities; and (b) to permit significance determinations for National Register eligibility.

(2) Location, identification, and limited testing of paleontological sites: (a) to determine presence or absence of fossil birdbone in sinkhole deposits and (b) to determine the necessity and extent of future testing and more intensive recovery (salvage) of paleontological deposits.

The work task details outlined in the Scope of Work (dated 1/23/79) were generally followed for the field and laboratory work with the exception of a few modifications or changes that were made at the discretion of the Field Director. Even in those cases, however, the contracting officer for the U.S. Army Engineer Division was informed and consulted.

## METHODOLOGY

The fieldwork involved five discrete tasks:

- 1) Reconnaissance survey
- 2) Establishment of a grid system
- 3) Clearing and recording of individual sites
- 4) Instrument mapping
- 5) Limited subsurface testing for paleontological remains.

### Reconnaissance

Systematic traverses of the area were made on foot to make an initial assessment of the number and extent of the resources present. A system of flagging major components of the survey area, boundaries, unmodified sinkholes, and archaeological sites was utilized to facilitate relocation.

### Grid System

After the extent of the survey area was identified and defined, a 100-meter grid system was established to cover the total survey area, partly in compliance with Scope of Work Task Detail 5.a.(1), which only called for the establishment of primary and secondary baselines. In view of the spatial distribution of sites, the high number of paleontological sinkholes, and the heavy vegetation, the utilization of a grid system facilitated location, mapping, and systematic sampling procedures. Initially an 800-meter baseline was placed on the northern edge of Malakole Road, extending 500 meters west and 300 meters east from a zero point established adjacent to a dump access road. From this zero point, the second baseline was placed perpendicular to the first and extending northward for 600 meters to the upper limit of the survey area. From these two baselines, systematic 100-meter grid units were consecutively established. The grid units were designated by their SE corner coordinates (see Fig. 2 ), and grid corners were marked in the field to permit subsequent use as instrument survey stations. In order to determine accurate spatial relationships of the new sites to previously located sites, the zero baseline on Malakole Road was tied into the F.P.L.1 brass marker set on the access road to the existing barge harbor.

### Clearing and Recording of Individual Sites

Due to the heavy vegetation growth, in most cases sites had to be cleared

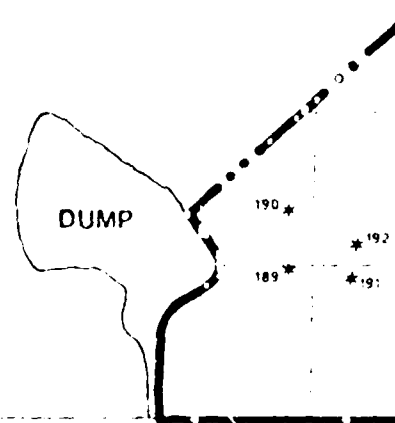
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## NEW DISPOSAL SITE SURVEY AREA AND GRID PLAN

BARBERS POINT, EWA, OAHU ISLAND  
MARCH, 1979

- ARCHAEOLOGICAL SITE
- \* TESTED PALEONTOLOGICAL SITE  
AVIFAUNAL REMAINS PRESENT
- ⊛ AVIFAUNAL REMAINS ABSENT
- ✱ POSSIBLE EXTINCT AVIFAUNAL REMAINS  
PREVIOUSLY SURVEYED

ARE.



500W

400W

Y AREA

SLAND

EMAINS

EXISTING CANE  
FIELDS

EXTENSIVELY

ALTERED

DUMP

AREA

DUMP

POND

MALAKOLE ROAD

400W

300W

200W

100W

00

100E

200E

300E

700N

600N

500N

400N

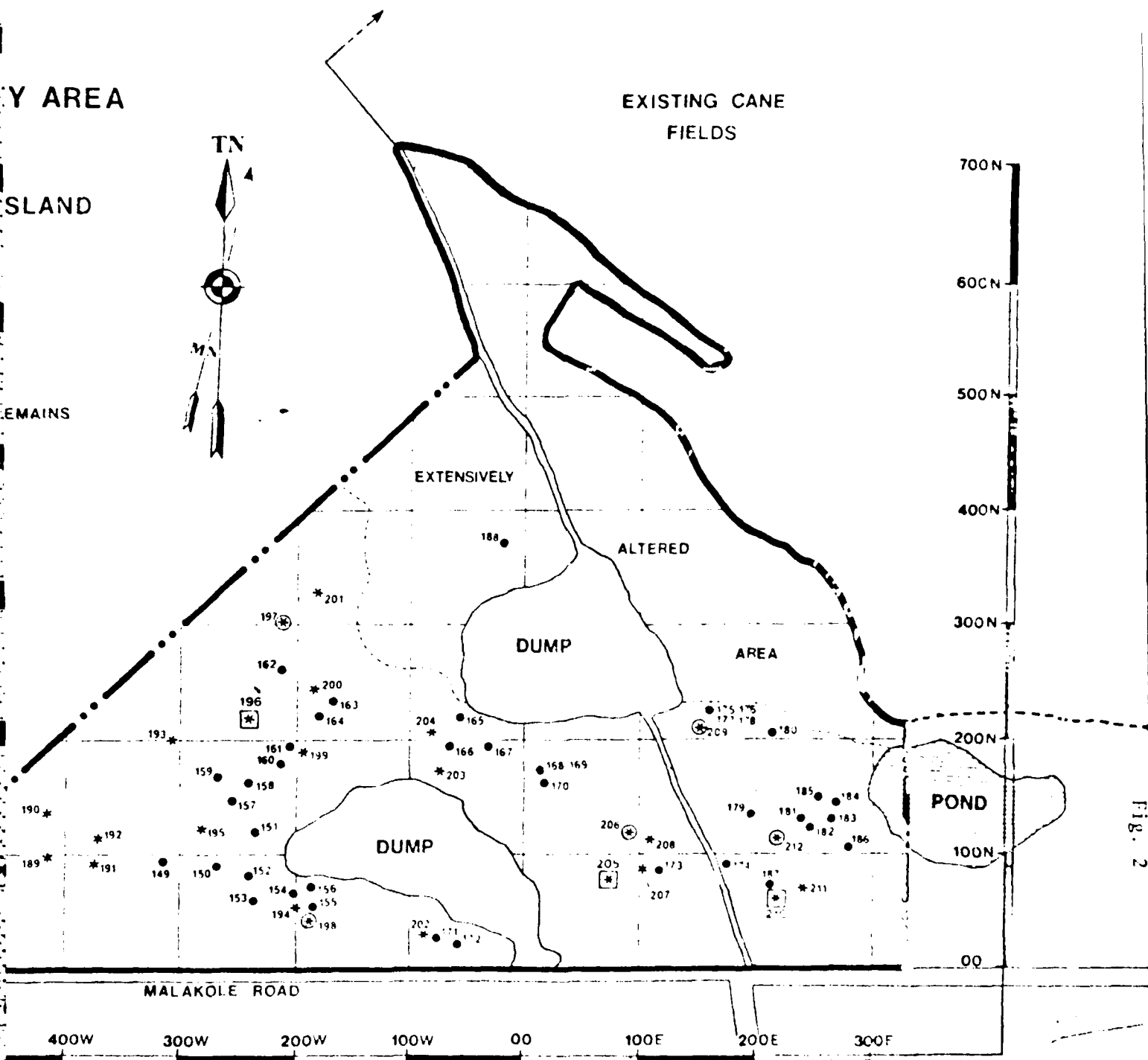
300N

200N

100N

00

Fig. 2



prior to recordation, and frequently large piles of debris from past bulldozing and clearing activities had to be removed from the sites. Each site was described, photographed, and mapped. The metric system was utilized for all measurements. Temporary numbers were assigned to the sites in the field, and with only a few exceptions, all features were assigned discrete site numbers. Permanent Bishop Museum site numbers were assigned in the laboratory phase of work, following the last site number assigned during the 1977 salvage project. All the archaeological sites were numbered consecutively, followed by all tested paleontological sinkholes. State Historic Register numbers were also assigned to all sites and a cross-reference appears on Tables 4 and 5.

#### Instrument Mapping

All archaeological sites were located by instrument stadia survey from the established grid corner points. For the paleontological sites, a systematic locational survey was conducted within a specified 2,500-square-meter area (or 625 square meters at each corner of a unit) at all grid corner points located in sited areas (see Fig. 4 ). For each located sinkhole, diameter of opening and relative depth dimensions were recorded.

#### Limited Subsurface Testing for Paleontological Remains

One sinkhole from each grid unit within minimally altered areas was tested. However, in grid 300E/00, the extreme eastern grid in an area exhibiting a marked paucity of sinkholes, two sinks were tested. One sink was near the 200E line and the other near the 300E line, allowing for more complete data on the distributional extent of avifaunal deposits. Since the sinkholes generally average 1.5 meters in diameter, instead of utilizing a test grid on the sink floors, a quadrat system was employed in systematic testing of portions of sinkholes. N/S and E/W lines evenly divided the sink floor into four units and, whenever possible, the NW quadrant was arbitrarily selected for testing to maintain consistency. Excavation was conducted by stratigraphic layer, but terminated when avifaunal materials were encountered. All excavated materials were bagged and brought into the laboratory for screening, processing, and analysis.

### ARCHAEOLOGICAL SURVEY RESULTS

Forty sites, representing twelve feature types, were located and recorded within the survey area. Each feature was designated as a discrete site unless an association between two or more features was clearly indicated. These sites can be subdivided into the following general categories:

- (1) Complex      An aggregation of different structural forms that exhibit a major functional association and a spatial continuity, and can be defined as a unit
- (2) Discrete structural forms      Artificially constructed features including walls, enclosures, platforms, *ahu*, C-shapes, L-shapes, U-shapes, and open filled/paved areas
- (3) Modified natural features      Modified sinkholes and depressions
- (4) Remnant features      Features in poor condition, precluding further definition into finer categories.

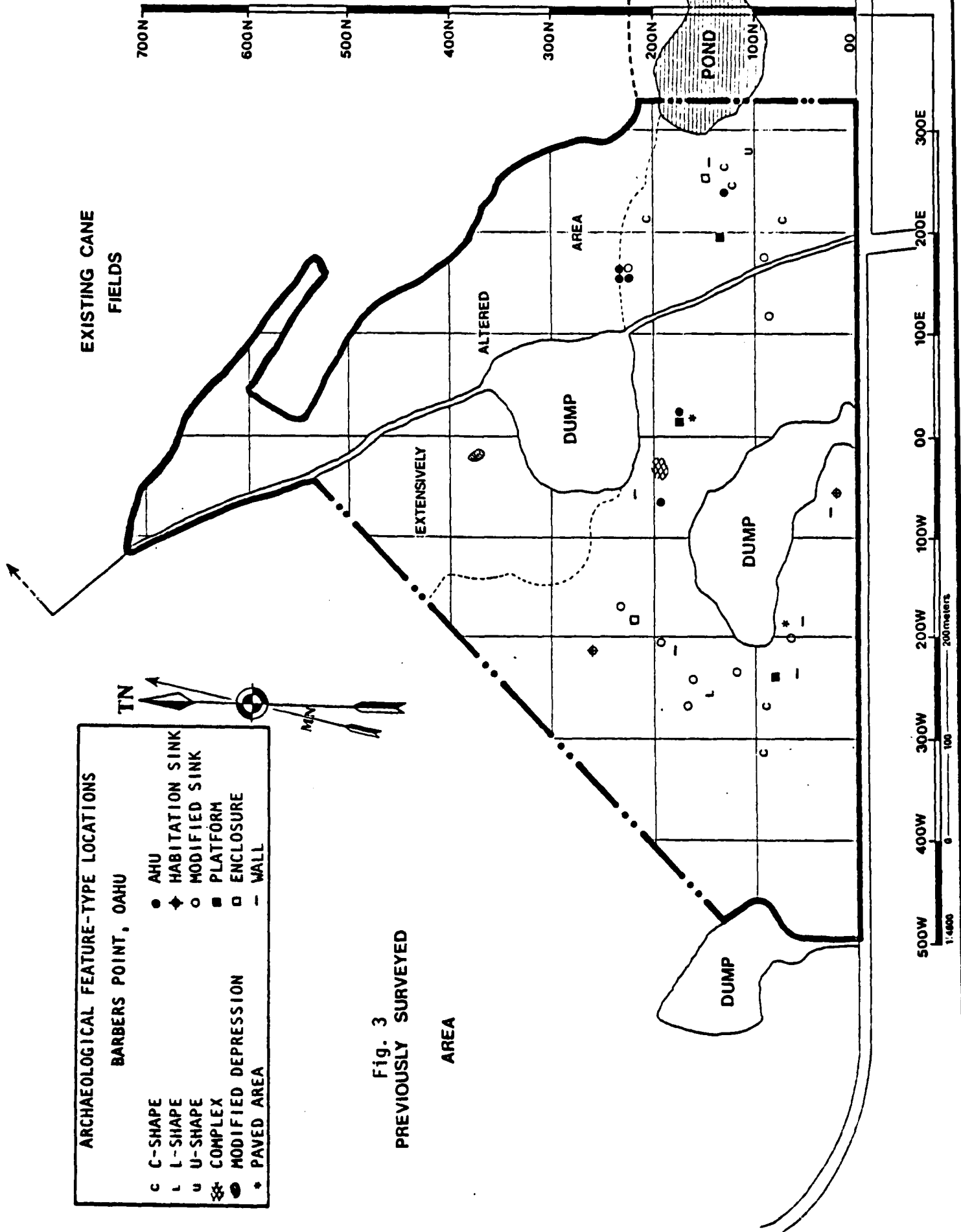
Table 1 lists the number of major feature types and variants. A short glossary defining terminology and use in this report follows the table. Figure 3 shows the distribution of feature types.

Site No. 50-0a-B6-

Feature Type	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	TOTALS		
Ahu																					1					1	1	1	1													6	
" w/sink																	1																										7
C-shape	1	1																																								1	
" modified																																											4
" w/sink																																											1
Complex																																											6
Enclosure-circular																																											1
" rectangular																																											1
Filled/Paved area																																											2
Habitation sink																																											1
L-shape w/sink																																											2
Modified depression																																											2
Modified sink																																											1
Platform																																											1
" rectangular																																											8
Remnant wall -																																											2
U-shape																																											3
TOTALS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	40	

GLOSSARY OF TERMS

<u>Ahu</u>	A mound of rocks, stone, and rubble, frequently with upright basal slabs. Varies in shape and size.
<u>C-shape</u>	A wall or structure resembling the letter "C" in plan view. Varies in size.
<u>Complex</u>	A multiple-feature site in which the spatial and structural relationships of the aggregation indicate that these are components of a single unit.
<u>Coralline</u>	Refers to the coral-algae, calcareous reef rock that, in the karst environment, is the only available construction material. All structures described in this report are constructed of coralline rock.
<u>Enclosure</u>	A structure with walls surrounding an interior floor space. Size and shape vary.
<u>Filled/paved area</u>	An artificially levelled, open area paved on the upper surface and frequently incorporating a filled sinkhole.
<u>Habitation sink</u>	A large sinkhole, usually with some modifications; large enough to allow easy access, and with a large overhang area affording shelter.
<u>L-shape</u>	A wall or structure resembling the letter "L" in plan view. Varies in size.
<u>Modified depression</u>	A natural sunken or depressed feature, usually distinguished from sinkholes by the larger size and shallow depth. An artificial wall or other modifications indicate utilization.
<u>Modified sink</u>	A natural feature, of varying size and depth, that is common to the karstic environment, with artificial modifications.
<u>Platform</u>	A structure varying in shape and size with a levelled upper surface, frequently incorporating natural outcrops and bedrock slabs. The construction consists of an outer facing with an interior fill.
<u>Remnant wall</u>	A generally deteriorated or extensively damaged feature, most often a remnant of larger structure. Present condition precludes further definition into different type categories.
<u>U-shape</u>	A wall or structure resembling the letter "U" in plan view. Varies in size.



SITE DESCRIPTIONS

The following descriptions list the sites in numerical order, with grid location and feature type categories, to facilitate reference to the location map. Refer to Appendix I for figures and photographs.

Site 50-0a-B6-149 (Fig. I-1)

Grid Location: 300W/00  
Feature Type: C-shape  
Total Area:\* 16 square meters  
Dimensions (meters): Length, 6.1; width, 2.6; wall width, 1.3;  
 height, .40.

Description:

This site is a small C-shaped structure in deteriorated condition, constructed of stacked corraline rock and slabs. Exhibits moderate deposit, aeolian in character, within the floor area.

---

Site 50-0a-B6-150 (Figs. I-2 )

Grid Location: 200W/00  
Feature Type: C-shape  
Total Area: 6 square meters  
Dimensions (meters): Length, 4.1; width, 1.5; wall width, .80;  
 height, .75.

Description:

Small, rather crudely constructed C-shape, constructed of stacked coralline rock and slabs. Lies directly on the solid limestone substrate; no deposit is present.

---

Site 50-0a-B6-151 (Fig. I-3)

Grid Location: 200W/00  
Feature Type: Modified sink  
Total Area: 22 square meters  
Dimensions (meters): Wall: length, 7.4; width, .7; height, .30  
 Sink: length, 1.8; width, 1.7; depth, .60/filled.

---

\*The total area is not necessarily limited to the surface structural perimeters; it also takes into account other factors such as cleared or modified areas around sites, midden scatters, and areas surrounding sites with excavation potential.

Site 50-Oa-B6-151 (cont'd.)Description:

This site consists of a filled sinkhole incorporating a wall and a small platform area. The wall is .60 meter from the NW periphery of the sinkhole. The southern portion of the sinkhole rim is built up with a small, crude wall, standing one stone high. At the western terminus of this sinkhole rim wall a platform is attached, measuring 1 by 1 meter and .25 m high. This platform incorporates a natural outcrop, which adjoins the longer wall. This longer wall may have been double-faced originally, utilizing upright coralline slabs along the base; although two upright slabs still remain, the general disturbed condition of the site precludes further definition.

---

Site 50-Oa-B6-152 (Fig. I-4)

Grid Location: 200W/00  
Feature Type: Rectangular platform  
Total Area: 7 square meters  
Dimensions (meters): Length, 3.4; width, 2; height, .30.

Description:

This site exhibits moderate disturbance. Its south corner is collapsed and upright slabs are displaced. It is constructed of stacked coralline rock and upright basal slabs, two of which are still standing at the east and west corners. The structure appears to be rock and rubble-filled with the upper surface leveled and paved with small slabs.

---

Site 50-Oa-B6-153 (Fig. I-5)

Grid Location: 200W/00  
Feature Type: Remnant Wall  
Total Area: 11 square meters  
Dimensions (meters): Length, 5.4; width, 2.1; wall width, .80; height, .30.

Description:

This site appears to be a remnant corner of an extensively disturbed structure. Its original shape and size are undefinable due to its disturbed

Site 50-Oa-B6-153 (cont'd.)Description:

condition. The wall construction is stacked coralline rock and slabs. The extent of damage and the large amounts of loose rubble and debris indicate that this site may have been bulldozed. No deposit was evident.

---

Site 50-Oa-B6-154 (Fig. I-6)

Grid Location: 100W/00  
Feature Type: Modified sink  
Total Area: 7.25 square meters  
Dimensions (meters): Length, 2.9; width, 2.5; wall height, .30; sink depth, 1.5/filled.

Description:

This site consists of an elongate sinkhole, 1 by 1.7 meters, with a low wall partially encircling the rim of the sink opening. The wall is constructed of stacked coralline rock and is generally deteriorated. The western periphery of the sink was left open. The interior of the sinkhole is filled with coralline rock and rubble.

---

Site 50-Oa-B6-155 (Fig. I-7)

Grid Location: 100W/00  
Feature Type: Remnant wall  
Total Area: 17 square meters  
Dimensions (meters): Total length, 7; length of segments, 3.5 & 2.4; total width, 2.4; wall width, 1; height, .55.

Description:

This site consists of two sections of disturbed, stacked-stone features. The orientation of the two features and the nearby rubble suggests the remains of an extensively disturbed structure, probably bulldozed. Lying directly atop the solid limestone substrate, this structure exhibits no deposition on the interior floor area.

---

Site 50-Oa-B6-156 (Fig. I-8)

Grid Location: 100W/00  
Feature Type: Filled/paved area  
Total Area: 8 square meters  
Dimensions (meters): Length, 4; width, 2; height, .25;  
central portion slightly depressed.

Description:

This site is a roughly rectangular area of coralline rock and slab fill. Most of the structure is level with the ground, but the western edge stands one stone high. The depressed area in the central portion of this feature may be a filled sink. Similar sites have been recorded during previous projects in the adjoining survey zone.

---

Site 50-Oa-B6-157 (Figs. I-9 & -10)

Grid Location: 200W/100N  
Feature Type: L-shape with sink  
Total Area: 7.6 square meters  
Dimensions (meters): Wall: length, 3.8/2; width, .80/1; height, .55  
Sink: length, 1.5; width, .80; one deep sink (1.2)  
and one shallow sink (.40).

Description:

This site consists of a small shallow sink, partially enclosed by an L-shaped wall. The longer segment of the L-shape overlies a deep sink, 1 meter in diameter. The wall is constructed of stacked coralline rock and slabs, directly atop the solid substrate. Depressed areas surrounding the exposed shallow sinkhole, in the interior floor of the feature, are filled with coralline pebbles. No deposit was present.

---

Site 50-Oa-B6-158 (Figs. I-11 & -13)

Grid Location: 200W/100N  
Feature Type: Modified sink  
Total Area: 12 square meters  
Dimensions (meters): Length, 4; width, 3; wall height, .20; depth,  
1/filled in areas

Site 50-Oa-B6-158 (cont'd.)Description:

This site consists of a partially filled, elongate sinkhole with a crude wall constructed around the opening. The wall exhibits a generally deteriorated condition and the NW portion is completely displaced. Portions of the sink are filled with coralline rock and rubble.

---

Site 50-Oa-B6-159 (Fig. I-12)

Grid Location: 200W/100N

Feature Type: Modified sink

Total Area: 9 square meters

Dimensions (meters): Length, 3; width, 1.6; wall width, 1.2; wall height, .25; maximum depth, 2.

Description:

This site is an elongate sinkhole with a deteriorated wall along the northern periphery of the opening. This wall is highly disturbed and only a few stones and slabs are still intact. The southern portion of the sink interior is fill, with coralline rock and rubble to a depth of 1.2 meters below the opening; the exposed sink floor at the northern end measures 2 meters deep.

---

Site 50-Oa-B6-160 (Fig. I-14)

Grid Location: 200W/100N

Feature Type: Remnant wall

Total Area: 2.8 square meters

Dimensions (meters): Length, 2.8; width, .80; height, .40.

Description:

This site is an extensively disturbed segment of a wall or structure. It is constructed with stacked slab and originally may have incorporated basal upright slabs. Only one such slab is still intact. Large rubble piles nearby suggest disturbance by bulldozer. Due to the extent of destruction, the original morphology of this feature is indiscernible.

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Site 50-Oa-B6-161 (Fig. I-15)

Grid Location: 200W/200N  
Feature Type: Modified sink  
Total Area: 3 square meters  
Dimensions (meters): Length, 1.7; width, 1.2; wall height, .35; sink depth, 1.8.

Description

This site is a small, deep sinkhole modified along the northeastern periphery of the opening with a crude wall of upright coralline slabs. One row of slabs, supported by small rocks and rubble, leans in toward the opening. A solitary upright is standing at the SW rim of the sink opening.

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Site 50-Oa-B6-162 (Figs. I-16 & -17)

Grid Location: 200W/200N  
Feature Type: Possible habitation sink  
Total Area: 22 square meters  
Dimensions (meters): Length, 5.5; width, 4; depth, 1.8; interior ceiling depth, 1.3.

Description:

The occurrence of sinkholes large enough to be utilized as shelters or habitation sites is uncommon. This was the only sink of this type located within the current survey and only four other such sinkhole sites are known in the previously surveyed area.

This site consists of a large, deep sinkhole with an adjoining cave or overhang area. A large slab of the karstic substrate has been naturally uplifted to form the caprock or roof of the interior cave. The interior floor of both the exposed and covered areas exhibits substantial deposit (20+cm) and a crude, coralline-slab wall divides the floor area.

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Site 50-Oa-B6-163 (Fig. I-18)

Grid Location: 100W/200N  
Feature Type: Modified sink with large upright slab  
Total Area: 17 square meters  
Dimensions (meters): Wall: height, .25  
 Sink: length, 3.2; width, 1.2; depth, .80.

Site 50-Oa-B6-163 (cont'd.)Description:

This site consists of two features. A small sinkhole, with a crude rim wall in deteriorated condition, is situated .60 meter northwest of a large, solitary, upright slab propped up by several fist-sized rocks. This slab is 1.9 meters long, 1 meter high, and .23 meter thick.

---

Site 50-Oa-B6-164 (Figs. I-19 & -20)

Grid Location: 100W/200N  
Feature Type: Rectangular enclosure  
Total Area: 9 square meters  
Dimensions (meters): Length, 3; width, 2.8, wall width, .80;  
 Height, .40.

Description:

This is one of the more well-constructed and well-preserved sites in the current survey area. It is a rectangular enclosure with double-faced walls incorporating basal upright slabs. The northeast corner exhibits the best preservation. An apparent doorway is situated near the southwest corner on the south wall. The interior floor appears to be paved with small slabs, and aeolian soil deposits of moderate thickness are present in localized pockets.

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Site 50-Oa-B6-165 (Fig. I-21)

Grid Location: 00/200N  
Feature Type: Remnant wall  
Total Area: 60 square meters  
Dimensions (meters): Length, 14; width, 5; wall width, 3; height, .50.

Description:

This site is in a poor state of preservation. Two parallel rows of rubble are visible with only the southern portion of the western wall still intact. Due to its condition, further definition is not possible. This site may be the remnant of a bulldozed structure or wall. No deposit was evident.

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Site 50-Oa-B6-166 (Figs. I-22 & -23)

Grid Location: 00/100N  
Feature Type: *Ahu* with sinkhole

Site 50-Oa-B6-166 (cont'd.)Total Area: 10 square metersDimensions (meters): *Ahu*: length, 3.6; width, 2.8; height, .60  
Sink: length, 2.25; width, 1.2; depth, 1.75.Description:

This site consists of a moderate-sized *ahu* adjoining a deep, elongate sinkhole. The *ahu* is roughly rectangular or trapezoidal, incorporates a basal facing of upright coralline slabs, and the top is levelled and paved with slabs laid horizontally. A tree growing atop the *ahu* has displaced some of the slabs, especially along the southern edge of the structure. The sinkhole is located immediately fronting the north edge of the *ahu*. The sinkhole is deep, but appears to be partially filled.

Site 50-Oa-B6-167 (Figs. I-24 & -25)Grid Location: 00/100NFeature Type: ComplexTotal Area: 624 square metersDimensions (meters): Length, 26; width, 24.Description:

A large aggregation of associated structural forms, this site includes walls, alignments, terrace areas, sinkholes, *ahu*, modified depressions, and enclosed soil-filled areas. The spatial and structural relationships of the different features indicate that they are components of a single site. An agricultural site is suggested.

Site 50-Oa-B6-168 (Fig. I-26)Grid Location: 100E/100NFeature Type: PlatformTotal Area: 5 square metersDimensions (meters): Length, 2.5; width, 2; height, .20.Description:

This site is a small rectangular platform incorporating a large bedrock slab at its western end. It is constructed of coralline rock and slabs with pebble fill in depressed areas. The upper surface is fairly level, but not paved.

Site 50-Oa-B6-169 (Fig. I-26)Grid Location: 100E/100NFeature Type: *Ahu*Total Area: 17.5 square metersDimensions (meters): Length, 5; width, 3.5; height, .40.Description:

This feature is an irregularly shaped mound in poor state of preservation. It is constructed with stacked coralline stones and slabs. The upper portion of this structure is mounded, and there is fallen rubble around its base. Recent bulldozer activity is indicated by the disturbed surrounding area and nearby rubble piles.

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Site 50-Oa-B6-170 (Figs. I-27 & -28)Grid Location: 100E/100NFeature Type: Filled/paved areaTotal Area: 25 square metersDimensions (meters): Length, 5; width, 4.7; height, .20; depth of depression, .50.Description:

This site is a large rectangular or trapezoidal area, only slightly higher than the surrounding ground surface. It is constructed with coralline rock and slabs. In the central portion of this feature is a depressed area, 3 by 1.8 meters, that may indicate a filled sinkhole.

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Site 50-Oa-B6-171 (Fig. I-29)Grid Location: 100W/00Feature Type: Remnant wallTotal Area: 2 square metersDimensions (meters): Length, 2; width, .7; wall width, .50; height, .50.Description:

This site is located on the periphery of a bulldozed area. The orientation and configuration of this deteriorated wall segment suggest the remnant eastern corner of a larger structure, most of which appears to have been destroyed

Site 50-Oa-B6-171 (cont'd.)

by bulldozer. One upright slab, .50 meter high, still stands at the central portion of this feature. Minimal deposit is present in the interior floor area.

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Site 50-Oa-B6-172 (Figs. I-30 & -31)

Grid Location: 100W/00  
Feature Type: Modified sink/possible habitation sink  
Total Area: 7 square meters  
Dimensions (meters): Length, 4.6; width, 1.6; wall height, .25.  
 Sink: length, 1.8; width, 1.1; depth, 1.5.

Description:

This site is a moderate-sized sinkhole with a crude wall along the eastern periphery of its opening. This wall is composed of a single, crudely built alignment of coralline slabs. Inside the exposed portion of the sinkhole, a side cavern 2 meters long opens into the eastern edge. The ceiling is low (1 meter high), and a moderate soil deposit and some midden materials were visible on the interior floor.

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Site 50-Oa-B6-173 (Fig. I-32)

Grid Location: 100E/00  
Feature Type: Modified sink  
Total Area: 4.4 square meters  
Dimensions (meters): Length, 3.7; width, 1.2; wall height, .70.  
 Sink: length, 1.5; width, .5; depth, 2.

Description:

This site consists of a small, elongate, deep sinkhole with a large coralline slab placed over the opening as a capstone. Several crudely placed stones define a small wall adjoining the north end of the sinkhole.

---

Site 50-Oa-B6-174 (Fig. I-33)Grid Location: 200E/00Feature Type: *Ahu*Total Area: 5.2 square metersDimensions (meters): Length, 3; width, 2.5; height, .55.Description:

This site is constructed of stacked coralline rock and slabs, which define a roughly rectangular structure. A large bedrock outcropping is incorporated into the southwest corner of the structure. Two upright slabs appear on the north and east sides of the feature. The upper surface of the structure is neither levelled nor paved.

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Site 50-Oa-B6-175 (Figs. I-34 & -35)Grid Location: 200E/200NFeature Type: *Ahu*Total Area: 5 square metersDimensions (meters): Length, 2.5; width, 2; height, .70.Description:

This structure is a roughly rectangular mound of stacked coralline stone and slabs. The eastern portion of the feature appears to have been damaged by bulldozing activities nearby.

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Site 50-Oa-B6-176 (Fig. I-34)Grid Location: 200E/200NFeature Type: *Ahu*Total Area: 12 square metersDimensions (meters): Length, 4; width, 3; height, .40.Description:

This feature is a roughly triangular, low mound, crudely constructed of stacked coralline slabs and boulders. Several large boulders are placed at the apexes of the structure, and two small upright slabs are present near the northern apex.

---

Site 50-Oa-B6-177 (Fig. I-34)

Grid Location: 200E/200N  
Feature Type: *Ahu*  
Total Area: 1.5 square meters  
Dimensions (meters): Length, 1.5; width, 1; height, 1.

Description:

This site is a small, high mound of stacked coralline slabs and rock. No upright slabs were utilized in the construction.

---

Site 50-Oa-B6-178 (Fig. I-34)

Grid Location: 200E/200N  
Feature Type: Modified sink  
Total Area: 8.75 square meters  
Dimensions (meters): Length, 3.5; width, 2.5; wall height, .20.  
 Sink: length, 1.5; width, 1; depth, .50/filled.

Description:

This site consists of a small, partially filled sinkhole with a crude semi-circular wall along the southern periphery of the sink opening. The eastern edge of the sinkhole is partially filled in with coralline rubble and rocks. The exterior wall is in deteriorated condition and portions appear to have been bulldozed.

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Site 50-Oa-B6-179 (Fig. I-36)

Grid Location: 200E/100N  
Feature Type: Platform  
Total Area: 17.5 square meters  
Dimensions (meters): Length, 5; width, 3.5; height, .33.

Description:

This site is an irregularly shaped platform incorporating a large out-cropping on the eastern side. The platform is constructed of two to three courses of stacked coralline slabs and rock. The outer facing of the structure is defined with larger stones, and the interior is filled with smaller fist-sized rocks, and levelled.

---

Site 50-Oa-B6-180 (Fig. I-37)

Grid Location: 300E/200N  
Feature Type: C-shape  
Total Area: 12 square meters  
Dimensions (meters): Length, 4; width, 3; wall width, 1; height, .40.

Description:

A crudely constructed semicircular structure open on the east side. Stacked slabs, stones, and upright slabs are utilized. Portions of the structure are displaced by *kiawe* trees and the site is generally in deteriorated condition.

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Site 50-Oa-B6-181 (Fig. I-38)

Grid Location: 300E/100N  
Feature Type: *Ahu*  
Total Area: 3 square meters  
Dimensions (meters): Length, 2; width, 1.5; height, .70.

Description:

This feature is a small mound of stacked coralline slabs and rock. A large fallen tree damaged the central portions of the structure. No upright slabs were utilized in the construction.

---

Site 50-Oa-B6-182 (Fig. I-39)

Grid Location: 300E/100N  
Feature Type: C-shape with attached wall  
Total Area: 27 square meters  
Dimensions (meters): Length, 6; width, 4.5; height, .44.

Description:

This is a relatively well-constructed C-shape with a small wall attached to its western exterior portion. The construction utilizes coralline rock and upright basal slabs in a double-faced, rubble-filled wall.

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Site 50-Oa-B6-183 (Fig. I-40)Grid Location: 300E/100NFeature Type: C-shapeTotal Area: 10 square metersDimensions (meters): Length, 4; width, 2.5; height, .48.Description:

This feature is a crudely constructed C-shape in deteriorated condition. Coralline slabs, rock, and rubble were stacked to form the wall, which incorporates a boulder at the southern end. It is constructed directly atop solid substrate and no deposit is present.

---

Site 50-Oa-B6-184 (Fig. I-41)Grid Location: 300E/100NFeature Type: Remnant wallTotal Area: 64 square metersDimensions (meters): Length, 16; width, 4; height, .60.Description:

This site appears to be an extensively disturbed remnant of a larger structure. Much of the wall is destroyed and in rubble. The remnant is constructed of stacked stone and a few upright slabs. Several *kiawe* trees are growing out of the wall and have displaced some of the stones. Built atop solid substrate, no deposit is present at this site.

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Site 50-Oa-B6-185 (Figs. I-42 & -44)Grid Location: 300E/100NFeature Type: Circular enclosureTotal Area: 20 square metersDimensions (meters): Diameter, 4.5; height, .60.Description:

This site consists of a circular enclosure with a semicircular, rubble-filled terrace attached on the eastern side. The enclosure is constructed of stacked coralline rock and has an interior basal facing of upright slabs. The interior floor is filled with fallen wall rubble, but it may have been paved originally. Several *kiawe* trees are growing on and around the structure, causing some damage.

---

Site 50-Oa-B6-186 (Fig. I-43)

Grid Location: 300E/100N  
Feature Type: U-shape  
Total Area: 20 square meters  
Dimensions (meters): Length, 5; width, 4; height, .45.

Description:

This feature is constructed of stacked coralline rock, stone, and upright slabs, atop a large substrate slab. The structure opens to the east and the interior is unpaved, with no deposit. Although the structure is somewhat deteriorated and details are poorly defined, it appears to have originally incorporated upright basal facings on the walls.

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Site 50-Oa-B6-187 (Fig. I-45)

Grid Location: 300E/00  
Feature Type: C-shape with sinkhole  
Total Area: 20 square meters  
Dimensions (meters): Length, 5; width, 4; wall height, .30; sink depth, 1.

Description:

This site consists of a small elongate sinkhole, 1 by 1.6 meters, with a crudely constructed C-shaped wall next to its eastern end. The wall is constructed of stacked coralline slab and stone with a few uprights. The interior floor, on solid substrate, exhibits no deposit.

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Site 50-Oa-B6-188 (Figs. I-46 & -47)

Grid Location: 00/300N  
Feature Type: Modified depression  
Total Area: 54 square meters  
Dimensions (meters): Length, 9; width, 6; depth, .50.

Description:

This site is a large natural depression with a wall around the periphery. The site is in generally deteriorated condition and much of the wall is rubbly. The interior floor is largely exposed substrate with intermittent areas of pebble-filled cracks and fissures. Minimal soil deposit is present in places, and small portions of walls are present in the interior of the feature. Much fallen rubble from the exterior rim wall presently occupies the interior of this feature.

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### PALEONTOLOGICAL SURVEY RESULTS

Sinkholes are characteristic ubiquitous features in a karst environment; while results of past investigations have shown that this is certainly true for the Barbers Point region, the extent and types of sinkholes were noted to vary in different locales within one survey area. The reconnaissance phase of the present survey revealed that the number of unmodified sinkholes with possible paleontological significance was extremely high, even when compared to the previously surveyed areas.

The identification and map-location of all of these features was neither the primary focus of the Scope of Work nor feasible, especially in view of the time allocated for the fieldwork. Thus, a systematic locational inventory was undertaken to allow accurate estimation of sinkhole densities. Utilizing the intersect points of the 100-meter grid system as center points, sampling areas of 2,500 square meters were established at 100-meter intervals (and at one 50-meter point, to avoid artificially altered areas; at two points, only 625 square meters were covered due to the limited size of the total grid area) (Fig. 4).

The reconnaissance had shown that the number of sinkholes decreased markedly at the northern, previously altered portion of the survey area. The majority of the locational inventory was limited to the remaining southern portion. The criteria applied to the selection of sinkholes for the locational inventory was accessibility. This was tested and proved effective during the 1977 Salvage Project (Sinoto Ms.b:45); when sampling was conducted in sinkholes with small openings, utilizing a posthole boring tool, the results were largely negative, yielding no avifaunal remains. It was concluded that sinkholes with large openings exhibited much higher potential for the presence of avifaunal deposit. Thus, in the present case, sinkholes that are included in the inventory are those that allow for one person to enter easily and excavate the sink-floor deposit. In some cases, however, sinkholes with small openings were included if the interior floor area was large enough to permit excavation. All accessible sinkholes within the 2,500-square-meter areas were identified, map-located, and diameter of opening and relative depths were noted.

A total of 272 testable sinkholes was located in twelve sampling areas. In addition, 233 more sinkholes were located beyond the sampling area perimeters. In total, 505 sinkholes were located during the survey. Fig. 4 shows the number of sinkholes and the locations of the sample units, and Table 2 lists the total number of sinkholes located and identified by grid, including those located beyond the sampling area.

Table 2.

TOTAL NO. OF SINKHOLES IDENTIFIED AND LOCATED

(Including those beyond sampling area perimeters)

Grid Desig.	00N	100N	200N	300N	500N	600N	Totals
400W	7	26	--	--	--	--	33
300W	34	54	3	--	--	--	91
200W	39	31	59	36	--	--	165
100W	25	16	62	17	--	--	120
00	5	10	7	--	--	1	23
100E	6	5	--	--	--	--	11
200E	12	27	1	--	1	--	41
300E	16	5	--	--	--	--	21
Totals	144	174	132	53	1	1	505

Sampling Design

Economy, which is traditionally cited as the primary reason for sampling rather than collection of "all the data," is hardly a realistic justification. It could more logically be argued that a complete inventory of any large population about which little is known can never be taken. One's data thus only partially represent the population, and a sample derived in a known and controlled manner is far more compatible with the overall scientific paradigm than one taken in a whimsical or unstated way [Judge and Ebert 1975:83].

The major objective for the sampling of the current New Disposal Site area was to obtain a fairly accurate and workable estimation of the population of testable, unmodified sinkholes to be applied toward the formulation of recommendations for the mitigation of adverse effects on paleontological resources. The systematic quadrat sampling design was viewed as most appropriate for several reasons:

(1) Systematic sampling provides a plan where individual sinkholes are spread evenly over the total area to be sampled.

(2) "Practically, systematic sampling seems to result in parameter estimates of accuracy similar to those obtained with random sampling, but with greater precision" (Judge and Ebert 1975:87).

(3) "Systematic sampling, in which an initial grid unit is randomly fixed and subsequent units are spaced according to a predetermined regular interval, is more appropriate to the realities of areal sampling" (Judge and Ebert 1975:87).

(4) "Systematic samples may give better estimates of mean values (because the [total area] is involved) than simple random samples will..." (Krumbein 1965:142).

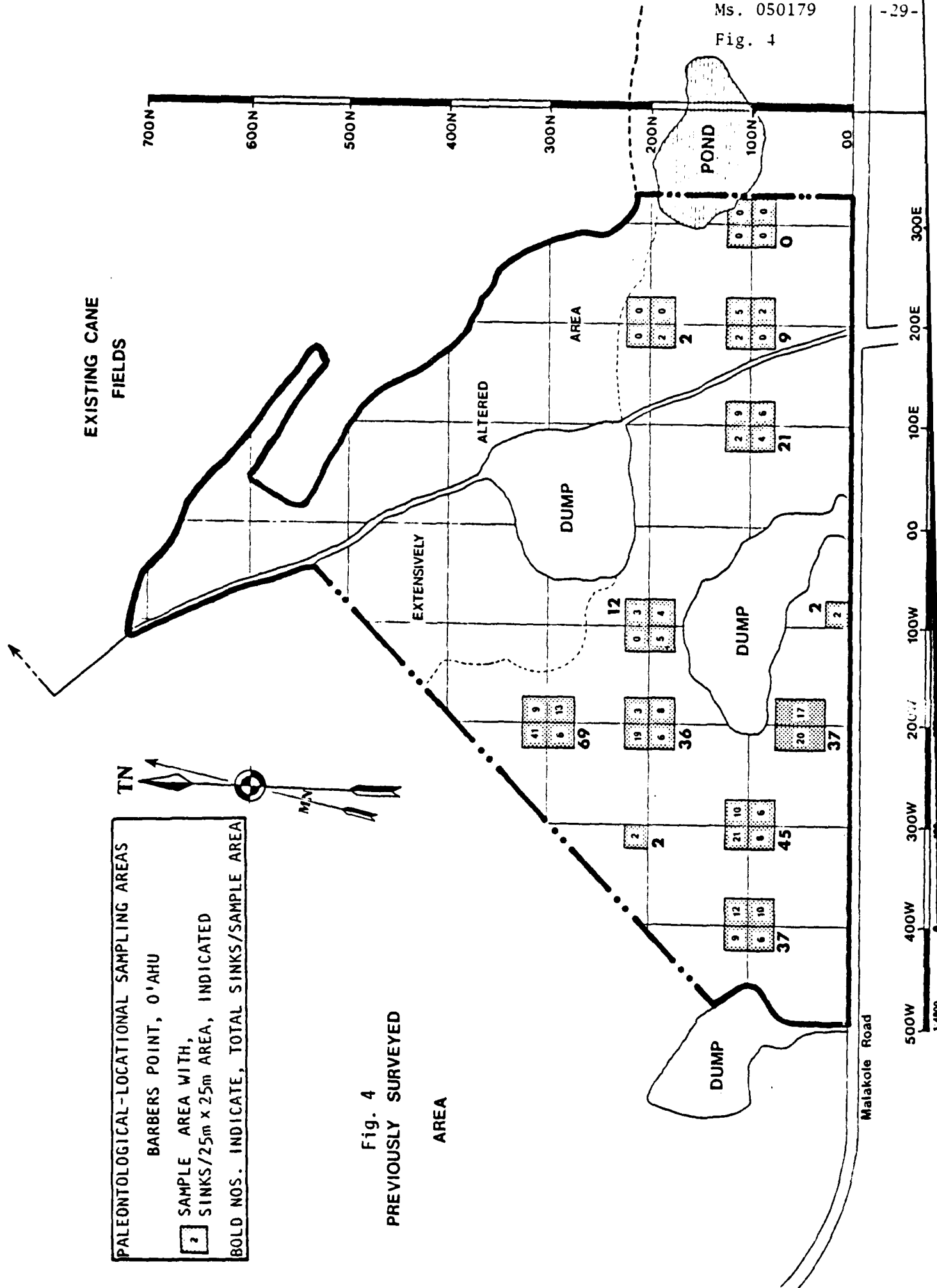
(5) With a systematic grid system already established and employed during the initial phase, locational mapping of archaeological features, the quadrat design was the technique that was easiest to apply.

For the current project, in view of the relatively uncomplicated nature of the sampling objective, the major determinant of the quadrat unit size, interval, and orientation was a practical one based primarily on the adequacy of the sample area in relation to the total area, the optimum instrument visibility through the vegetation with a minimum of clearing. With a complete inventory of sinkholes that meet the paleontological criteria, present within evenly distributed sample areas of identical or proportional size, the frequency data can be used to obtain a mean value that can then be projected to cover the whole survey area. The projected mean value is 104 testable sinkholes per 10,000 square meters. Applying this value to the total surface area, a projected number of testable sinkholes present in the survey area can be estimated. The frequency data is tabulated on the following table.

Table 3.  
FREQUENCIES OF TESTABLE SINKHOLES  
LOCATED DURING AREAL SURVEY

<u>Center Pt. of</u> <u>Sample Area</u>	<u>Area</u> <u>Tested (m<sup>2</sup>)</u>	<u>No. Sinks</u>	<u>No.Sinks/</u> <u>10,000 (m<sup>2</sup>)</u>
400W/100N	2500	37	148
300W/100N	2500	45	180
300W/200N	625	2	32
200W/50N	2500	37	148
200W/200N	2500	36	144
200W/200N	2500	69	276
200W/300N	625	2	32
100W/00N	2500	12	48
100W/200N	2500	21	84
100E/100N	2500	9	36
200E/200N	2500	2	8
300E/100N	2500	0	0
		272	1136

Mean value, 104 sinks/10,000 m<sup>2</sup>



### Limited Subsurface Testing

Subsequent to the areal surface inventory, systematic subsurface testing of sinkhole deposits was undertaken. Twenty-four sinkholes were tested, one from each of the grids in the southern portion of the survey area. Since the major objective was the determination of presence/absence and distribution of potential fossil avifaunal remains, each sinkhole was only partially excavated. Utilizing a quadrant system based on magnetic north, the northwest quadrant from each sinkhole was excavated until a birdbone-laden layer was encountered or to sterile substratum.

Generally the excavated sinks displayed stratigraphic homogeneity. The avifaunal remains occurred from the surface of the sink deposit to the second stratigraphic component, and generally were not found below 20 cm in depth from top of overburden. The recovered material was highly disturbed and mixed, a trend also observed in most of the unmodified sinkholes previously excavated in the adjoining area. No articulated or closely associated bones from individual birds were recovered except for a nearly complete skeleton of an extant heron (*Nycticorax nycticorax*) from the surface of deposit at B6-207.

Nineteen of the 24 sinkholes tested yielded avifaunal remains, and five produced no avifaunal material. The occurrence of avifaunal materials seems to be evenly distributed throughout the tested area. Further systematic testing is required to determine possible areas of concentrated birdbone occurrence.

Fig. 2 shows location and presence/absence of avifaunal remains as obtained through subsurface testing, Table 5 lists the tested sinkholes and remarks by grid. Detailed data on the test excavations are on file at the Department of Anthropology, Bishop Museum.

Since the testing of archaeological features was not included in the scope for the current project, no modified sinks were excavated.

### Preliminary Analysis of Recovered Avifaunal Material

During the laboratory phase of the Salvage Project in 1977, minute, complete birdbones were recovered from size-sorting screens used by the geologist. Since these bones were of considerable interest and significance to the avian paleontologist, for this current phase of work all screening was done in the laboratory by a zoological assistant under the supervision of Dr. Alan Ziegler. All excavated materials were processed through graduated metric sorting screens. Initially the total volume of recovered material

was mechanically screened through larger mesh sizes equivalent to the 1/4" and 1/8" mesh screens regularly used in the field; 25% of the material that passed through these two mesh sizes was screened through finer mesh sizes, down to .5mm, to determine the presence of any minute bones and fragments.

Among the non-avifaunal materials retained from the screening process were bones from mammals, rodents, fish, and reptiles, and some marine invertebrates and shells, most notably various types of land snails. For the purposes of this report, only the avifaunal bones were further analyzed.

Many birds of various size ranges are represented in the recovered skeletal material. The lack of associated bones and articulated specimens made the task of identification, even at this preliminary level, extremely difficult. Often only one or two complete bones and fragments from individual birds were recovered.

Preliminary identifications are limited to categories except for extant species, since a specialist is needed for identification to genera and species. After the cataloguing is completed, the material will be sent to Dr. Storrs Olson of the National Museum of Natural History, Washington, D.C.

Fortunately, as observed from the previously catalogued material, some of the bones from extinct species are diagnostic. Three of the nineteen sinkholes that yielded avifaunal remains were determined to contain extinct species. These were B6-205 in Grid 100E/00, B6-210 in Grid 300E/00 and B6-196 in Grid 200W/200N. For the other material definitive determinations cannot be made at this time. A complete catalogue of specimens and preliminary identifications are included in Appendix II of this report.

## DISCUSSION

### Archaeology

The analysis of archaeological data recovered during the surface survey of the New Disposal Sites area indicates that this area is a continuation of the previously investigated adjoining area. The two major factors that support this assumption are:

- (1) There is no spatial hiatus segregating the archaeological components of the current survey area from those of the adjoining area.
- (2) None of the newly recorded structural forms display attributes that are unique or significantly different from previously known sites in the area. The same morphological feature types are represented in the adjoining area.

However, a different level of intensity in the exploitation of the two areas may be indicated. In comparing the current area to the adjoining area, a difference in the frequency of certain feature types was noted. The current area displays a small number of the larger, more structurally complex forms, such as enclosures and platforms; of the total number of features recorded, only 15% fall into this category. By contrast, all of the survey units investigated during the Cultural Resources Survey in 1976 (Sinoto Ms.a) exhibited roughly twice this frequency (30%) of the larger features. Thus, the low frequency of structurally complex features and the predominance of simpler, cruder types of smaller structural forms such as C-shapes, *ahu*, and modified natural features, may indicate that the current area is a relatively marginal portion of a large complex.

Three sites, from the New Disposal Sites area, B6-162, -164, and -167, are of specific interest. B6-164, the rectangular enclosure, although small in size, exhibits a more refined construction technique when compared with the more commonly occurring, crudely built, structures. This may be attributable to functional or temporal differences; however, intensive investigation is necessary to substantiate these points. Sites B6-162 and -167 are tentatively classified as habitation sinkholes. Only three other such sites have

been recorded from the adjoining areas: B6-22, -137 (Sinoto, Ms.a), and B6-100C (Sinoto, Ms.b). Excavations at B6-22 and B6-100C yielded cultural material as well as skeletal avifaunal remains. Adequate datable materials were not recovered from either of these sites; however, the artifactual assemblage from the salvage excavation at B6-100C indicated prehistoric occupation. Both of these sites contained avifaunal material and the first of the extinct avifaunal material was recovered from Site B6-22 in 1976 (Sinoto, Ms.a). Site B6-137 was not excavated, but a human burial was found on the surface of an interior crevice during a subsequent inspection of this site in 1976. The rarity of this type of feature in a region covered with sinkholes is probably due to the natural morphology of most of these sinkholes (limited accessibility, small interior size, no protective overhang), which makes them unsuitable for habitation. Thus, the rarity of these habitation sinkhole features and the potential for recovery of significant data, as demonstrated from previous excavations of similar sites, accords much archaeological importance to Sites B6-162 and -167.

An important consideration at this point, however, is the presence of extensively altered and cleared areas within the survey area and their effect on the validity of feature frequencies as discussed above. The presently discernible frequencies may simply reflect sampling limitations due to the destruction of formerly existing sites in the altered areas. Also, in regard to finer analyses such as settlement patterns and clustering, large gaps are created in the presently available data, which will influence and hamper such determinations.

Further intensive investigation and subsurface data are essential in defining the origins and nature of the archaeological resources in this area.

### Paleontology

During the two previous fieldwork periods in 1976 and 1977, the presence of avifaunal skeletal remains in sinkholes, modified as well as unmodified, was discovered. The specimens obtained from the Barbers Point region have paleontological significance in that they represent the best record of pre-historic avifauna yet found in the Hawaiian Islands.

The avifaunal inventory compiled for the Barbers Point area includes several major categories of significance:

- (1) species of birds that are totally extinct in the Hawaiian Islands, with no historic record of extinction;
- (2) species of birds that still exist today in the Hawaiian Islands but occupy a totally different type of habitat from that of Barbers Point;
- (3) species of birds that are extinct on O'ahu Island;
- (4) species of birds that are totally extinct in the Hawaiian Islands today, with a historic record of extinction.

The lack of certain species of birds in the Barbers Point remains is equally significant, in that these species are known from comparative habitats today.

Although no comparable determination of the number of testable sinkholes was undertaken during any of the previous surveys, the marked differences apparent from sheer observation in the field indicate that the current New Disposal Sites area appears to have the highest number of sinkholes of all the investigated portions of the Barbers Point region. Using the results of the areal sampling, the total number of testable sinkholes can be estimated at between 1,100 (conservatively) and 2,500 (using the mean value of 104/10,000 m<sup>2</sup>). The eastern area near the pond and the northeastern area bordering on the altered northern portion of the survey area display the lowest frequencies of unmodified sinkholes. The grids displaying the highest densities of sinkholes are in the western half of the southern portion of the survey area.

Of the tested sinkholes, 80% yielded avifaunal remains and 16% have been tentatively determined to contain extinct species. However, the preliminary identifications were made conservatively; with further analysis by a specialist, the number of extinct species will probably increase.

The discovery of the extant black-crowned night heron skeleton in sinkhole B6-207 was significant because it clearly demonstrated that accidental entrapment, even for flighted birds, was probably one of the reasons for the presence of avifaunal remains in the sinkhole deposits.

The situation in this area of Barbers Point provides an excellent opportunity for avian paleontologists to conduct further recovery and detailed investigations.

#### Significance

The presence of extinct avifauna raises intriguing and significant questions relating to the possible associations between the prehistoric human inhabitants and the avifauna. The current survey area, with an extremely high number of sinkholes, along with a moderate number of archaeological sites, affords an excellent opportunity to address these questions. Questions regarding direct predation, as well as indirect ecological influence of human activities leading to the extinction and emigration of certain species, could well be answered through a coordinated program of intensive archaeological, zoological, paleontological, and geological research. Such an effort will not only be rewarding for each of the specializations represented but will aid immensely in the understanding of the prehistoric environment of the Barbers Point region.

#### National Register Eligibility

For compliance with the National Environmental Quality Act (NEPA), the National Historic Preservation Act (NHPA), or Executive Order 11593, the National Register sets forth several criteria for the determination of eligibility of cultural resources for nomination to the Historic Places Register. One of these requisites (criterion d, 36 CFR 60.6), states in part that, to be eligible, the cultural resources in question must "have yielded or may be likely to yield, information important in prehistory or history," of the region. This criterion, which includes archaeological resources, is admittedly vague. In the State of Hawai'i alone, it would be applicable to

practically all recorded sites. On the other hand, it would be nearly impossible to formulate more specific criteria for a regulation of national-level jurisdiction, to be applicable to all of the regions and the variety of different cultural resources it encompasses. Therefore it becomes the responsibility of the archaeologist(s) familiar with a subject area to identify and determine the applicability of the criteria on specific points of significance of the cultural resources. In some instances, a qualitative judgement of the significance of the cultural resources is necessary. At present, without the benefit of adequate data-recovery completion, the significance of cultural resources at Barbers Point requires such an evaluation.

The archaeological resources at Barbers Point have been investigated piecemeal by various archaeological consultants. Furthermore, the accumulated data lack consistency, since not all of the investigations have been completed to comparable levels, nor have consistent standards been placed on the researches. Thus, at present, the available data are incomplete and the archaeological overviews presented are largely unsubstantiated. As stated earlier in this report and also emphasized in previous reports, the Barbers Point archaeological complex, as indicated by the results of investigations, appears to have been one continuous area, at least during its prehistoric exploitation. Additional work in the whole Barbers Point area has to be finalized before a comprehensive synthesis and interpretation of the archaeology, as well as a justifiable evaluation, can be attempted. The potential for the recovery of significant data has already been demonstrated by the sites tested or salvaged from the adjoining areas.

The adjoining areas were determined to be eligible for nomination subsequent to previous investigations, and in view of the points presented in the preceding paragraph, whatever additional data the New Disposal Sites area can yield (even negative results) will be vital in the synthesis of a holistic overview of the Barbers Point region. Thus, all sites recorded during the current survey, with the exception of those warranting no further work (Tables 4 & 5) should be considered eligible for nomination to the National Register. The phrase "may be likely to yield" is important here, since without protection, the sites--and the opportunity to intensively and adequately address the unique and potentially significant archaeological problems presented in this region--will be irretrievably lost.

### RECOMMENDATIONS

At the time of the Barbers Point Deep Draft Harbor construction, the New Disposal Sites area will be utilized to stockpile the coralline-lime-stone debris from the harbor dredging, for possible future processing as cement. However, since the kiln used for the processing cannot handle the quantity of salt in this material, a prolonged period of stockpiling is necessary to leach out the salt. Consequently, the Disposal Sites area will be buried under several meters of coralline debris for a protracted period of time or perhaps even permanently if the material is never processed. Thus, from practical and archaeological points of view, the cultural and paleontological resources in the area will be totally destroyed. The following recommendations are presented in view of this imminent total loss of these resources.

#### Archaeological Resources

A summary of recommended action and priority ratings for individual sites is given in Table 4. Priority ratings have been assigned according to the following criteria:

- (1) a. Sites exhibiting structural complexity and fair-to-good state of preservation  
b. Representative site types in good state of preservation.
- (2) a. Simple structural forms in fair-to-good condition  
b. Site types that are already represented in priority 1.
- (3) a. Sites in disturbed condition or poor state of preservation  
b. Site types that are well represented in priorities 1 and 2.  
(Further work on these sites is contingent on time allocated for work on sites designated as priority 1 and 2.)
- (0) Highly disturbed or nearly totally destroyed sites; further work unnecessary.

Recommendations for further work on individual sites have been based on the following criteria:

No further work--Sites that are highly disturbed or nearly totally destroyed.

Test--Sites with limited deposit and moderate to severe disturbance.

Test/Salvage--Contingent on the results of testing, sites that appear to have potential for intensive excavation, using a salvage strategy addressing a specific problem or research question.

Salvage--Site significance (e.g., priority 1 sites) dictates intensive data recovery.

Some general recommendations for anticipated archaeological work are presented below:

(1) Since no testing of archaeological features was conducted during the current phase of work, an initial period of testing is recommended to insure adequate data recovery and determination of those sites that warrant intensive data recovery prior to commencement of construction activities.

(2) Spatially clustered, discrete features should be intensively investigated to determine function of individual features and feature relationships, and to determine chronological and functional relationships among various feature clusters.

(3) Feature aggregations, such as exhibited in Site B6-167, should be investigated to determine functional aspects of the complex (i.e., agricultural, etc.).

(4) The results of previous excavations indicate the likelihood of avifaunal remains in some cultural sites, particularly in the floor deposits of modified sinkholes. Particular care should be exercised during testing or salvage of these sites in an attempt to determine the relationship between cultural sites and birdbone deposits.

(5) Due to the uniqueness of the Barbers Point environment and the nature of the potentially recoverable data, multi-disciplinary expertise is both necessary and desirable. Suggested consultants are:

Geologist/pedologist--Analyses in both field and laboratory to determine rates of deposit accumulation, identification of agricultural soils, dating of volcanic glass, etc.

Avian paleontologist--In the excavation of avifaunal remains the knowledge of avian osteology is essential in defining possible associated bones, etc. *In situ* preliminary identifications will also facilitate and accelerate the sampling and salvage procedures.

Malacologist--Collection of terrestrial snails, which will aid in environmental interpretation and dating (see Kirch in Sinoto Ms.b: Appendix II).

Table 4.

SUMMARY OF ARCHAEOLOGICAL SITES  
NEW DREDGED MATERIAL DISPOSAL SITE  
BARBERS POINT, O'AHU, HAWAII

BPBM No. 50-0a-B6-	State No. 50-80-12	Grid	Site Type	Evaluation	Recommendation*	
149	9646	300W,00N	C-shape	Fair condition, moderate deposit	Salvage	(1)
150	9647	200W,00N	C-shape	Fair condition, minimal deposit	Test/Salvage	(2)
151	9648	200W,00N	Modified sink	Fair condition, sink filled	Salvage	(1)
152	9649	200W,00N	Rectangular platform	Fair condition	Salvage	(1)
153	9650	200W,00N	Remnant wall	Poor condition, minimal deposit	Test	(3)
154	9651	100W,00N	Modified sink	Fair condition, sink filled	Salvage	(1)
155	9652	100W,00N	Remnant wall	Poor condition, minimal deposit	Test	(2)
156	9653	100W,00N	Filled, paved area	Fair condition, possible filled sink	Test/Salvage	(2)
157	9654	200W,100N	L-shape with sink	Fair condition, associated sink	Salvage	(1)
158	9655	200W,100N	Modified sink	Fair condition, sink filled	Salvage	(1)
159	9656	200W,100N	Modified sink	Poor condition, sink filled	Test/Salvage	(3)
160	9657	200W,100N	Remnant wall	Poor condition, minimal deposit	No further work	(0)
161	9658	200W,200N	Modified sink	Fair condition	Test/Salvage	(3)
162	9659	200W,200N	Possible habita- tion sink	Good condition, maximal deposit	Salvage	(1)
163	9660	100W,200N	Modified sink	Fair condition	Test/Salvage	(2)
164	9661	100W,200N	Rectangular enclosure	Good condition, moderate deposit	Salvage/ Preserve	(1)
165	9662	00,200N	Wall remnant	Poor condition, minimal deposit	No further work	(0)
166	9663	00,100N	Ahu with sink	Good condition, associated sink	Salvage	(1)
167	9664	00,100N	Large complex	Fair condition, moderate deposit	Test/Salvage	(1)

\*0 = no further work; 1 = high priority; 2 = medium priority; 3 = low priority.

Table 4 (cont'd.)  
 Summary of Archaeological Sites, New Dredged Material Disposal Site  
 Barbers Point, O'ahu, Hawai'i

BPBM No. 50-0a-B6-	State No. 50-80-12-	Grid	Site Type	Evaluation	Recommendation*
168	9665	100E,100N	Platform	Fair condition	Test/Salvage (2)
169	9666	100E,100N	Ahu	Fair condition	Test/Salvage (2)
170	9667	100E,100N	Filled, paved area	Fair condition, possible filled sink	Salvage (1)
171	9668	100W,00N	Remnant wall	Poor condition, minimal deposit	Test/Salvage (3)
172	9669	100W,00N	Possible habi- tation sink	Fair condition, moderate deposit	Test/Salvage (1)
173	9670	100E,00	Modified sink	Fair condition	Test/Salvage (1)
174	9671	200E,00N	Ahu	Fair condition	Test/Salvage (1)
175	9672	200E,200N	Ahu	Fair condition	Test/Salvage (1)
176	9673	200E,200N	Ahu	Fair condition	Test/Salvage (1)
177	9674	200E,200N	Ahu	Fair condition	Test/Salvage (1)
178	9675	200E,200N	Modified Sink	Poor condition	Test/Salvage (2)
179	9676	200E,100N	Rectangular platform	Good condition	Test/Salvage (1)
180	9677	300E,200N	C-shape	Fair condition	Test/Salvage (2)
181	9678	300E,100N	Ahu	Fair condition	Salvage (3)
182	9679	300E,100N	C-shape modified	Fair condition	Test/Salvage (1)
183	9680	300E,100N	C-shape	Fair condition	Test/Salvage (3)
184	9681	300E,100N	Remnant wall	Poor condition	Test (3)
185	9682	300E,100N	Circular enclo- sure	Fair condition	Test/Salvage (1)
186	9683	300E,100N	U-shape	Fair condition	Test/Salvage (1)
187	9684	300E,00N	C-shape with sink	Fair condition	Test/Salvage (2)
188	9685	00,300N	Modified depression	Fair condition Minimal deposit	Test/Salvage (1)

\*0= no further work; 1= high priority; 2= medium priority; 3= low priority.

### Paleontological Resources

Although the significance of the paleontological resources of the Barbers Point region should be well known by now, it cannot be over-emphasized:

The various limestone sinks on the raised reef at Barbers Point, Oahu, contain probably the most extensive fossil avifauna in Hawaii with many new species endemic to the island. Such fossils have not and probably cannot be found anywhere else on the island. Furthermore, the nature of the preservation is such as to insure that virtually complete skeletons can probably be assembled for most species. Thus, there is much highly significant and totally new biological and paleontological information that can be obtained only at the Barbers Point site.

Destruction of any of the potential fossil sinks would result in the loss of many specimens, some possibly unique, since one sinkhole might contain species absent in another. Also, the fauna of one sinkhole might not be coetaneous with that of another, the age of a deposit being determined by when a sinkhole first formed. Therefore, an investigation of the fauna of different sinks might show changes in species composition and changes in morphology within a species through time. Finally, it would also be desirable to retain some sinks intact as fossil "banks" should some new technique or different information be desired in the future. The fossil deposits at Barbers Point are a unique and irreplaceable resource [Olson in Sinoto Ms.a:74].

In the current New Disposal Sites area, with its extremely high number of unmodified sinkholes and the widespread presence of avifaunal material already established, maximal recovery of the paleontological material should be undertaken. This is especially true in view of the imminent total destruction of the area. Maximal recovery in this case, however, is impractical due to the high number of potentially significant sinkholes; total salvage is not only unfeasible, but also probably impossible.

Some specific and generalized recommendations are presented below:

(1) More extensive testing of unmodified sinkholes should be undertaken prior to salvage, to identify areas of sinkholes with maximum potential for recovery of fossil avifaunal remains. It may be possible to analyze sinkhole traits and distribution and to correlate these factors with the occurrence of avifaunal remains.

(2) During the intensive recovery phase, a set number of sinkholes at established intervals throughout the survey area should be designated as

controls. These sinks should be carefully examined for stratigraphic and other relevant components, while allowing accelerated salvage of other sinks in the proximity. Recovery of terrestrial snails is an important consideration here, since this would afford an opportunity for comparison with cultural sites in establishing relative age determinations.

(3) To economize on expenditure of time, the established grid system, which is physically marked in the field, should be used. This would greatly facilitate designation of control sinks as described above.

(4) Archaeological artifacts do occur in non-cultural sites, and this possibility should not be disregarded.

(5) As discussed earlier, avifaunal remains occur in some cultural sites. Particular care should be taken during data recovery in these areas.

(6) Especially during data recovery from control sinks, interdisciplinary expertise will effectively maximize the exploitation of available data and broaden the interpretive potential of the excavation data.

(7) The initial or preliminary sorting of the avifaunal material should be done in Hawai'i by a zoologist, if an avian paleontologist is unavailable. Since prior experience is a definite advantage, Dr. Alan Ziegler, who has coordinated this work in the past with Dr. Storrs Olson, is highly recommended. An important additional consideration here is the desirability of retaining a representative collection of avifaunal material in Hawai'i.

(8) The final identifications of fossil avifaunal material should be done by Dr. Storrs Olson of the National Museum of Natural Science, Washington, D.C., because of his interest and experience in Hawaiian avifauna.

Since these recommendations are made by an archaeologist, rather than a paleontologist, before any work is undertaken an avian paleontologist should be consulted to review the validity and applicability of these suggestions and to contribute additional recommendations or strategies.

Table 5.

SUMMARY OF PALEONTOLOGICAL SITES, NEW DREDGED MATERIAL DISPOSAL SITES,  
BARBERS POINT, O'AHU, HAWAII

BPBM No. 50-0a-B6-	State No. 50-80-12-	Grid	Birdbone Present	Size (Diam./Relative Depth)*	Recommendation
189	9686	400W,00N	+	1 /D	Salvage
190	9687	400W,100N	+	1.5/S	Salvage
191	9688	300W,00N	+	2 /D	Salvage
192	9689	300W,100N	+	1.5/S	Salvage
193	9690	300W,200N	+	1.5/D	Salvage
194	9691	200W,00N	+	1.5/D	Salvage
195	9692	200W,100N	+	1.5/D	Salvage
196	9693	200W,200N	**	1 /S	Salvage
197	9694	200W,300N	-	1.5/D	No further work
198	9695	100W,00N	-	2 /S	No further work
199	9696	100W,100N	+	1 /D	Salvage
200	9697	100W,200N	+	1.5/D	Salvage
201	9698	100W,300N	+	1.5/D	Salvage
202	9699	00,00N	+	1.5/D	Salvage
203	1700	00,100N	+	2 /D	Salvage
204	1701	00,200N	+	2 /S	Salvage
205	1702	100E,00N	**	1.5/S	Salvage
206	1703	100E,100N	-	2 /S	No further work
207	1704	200E,00N	+	.5/D	Salvage
208	1705	200E,100N	+	1.5/D	Salvage
209	1706	200E,200N	-	1.5/S	No further work
210	1707	300E,00N	**	1.5/D	Salvage
211	1708	300E,00N	+	5 /S	Salvage
212	1709	300E,100N	-	1 /S	No further work

\*D = deep; S = shallow. S &lt; 1 meter; D &gt; 1 meter.

\*\* = extinct species present.

### Focus of Further Research

The New Disposal Sites area at Barbers Point appears to be continuous portion of the adjoining, previously investigated area. The local environmental conditions and the types of cultural resources in these two areas exhibit no significant differences. Forty archaeological sites were located during the current survey, and considerable research potential is indicated. Three major points of significance are recognized for this area:

(1) This area represents an opportunity to extract data regarding prehistoric adaptation to the karstic environment and to add to the data that has already been accumulated.

(2) The presence of fossil bird bone is significant paleontologically and also provokes important questions regarding possible associations with prehistoric man.

(3) With extensive portions of the Barbers Point area already disturbed, the archaeological record is inevitably incomplete. Completion of intensive investigations in the New Disposal Sites area will assure that the majority of the still existing sited areas have been investigated. The accumulated data may then permit settlement pattern analysis for the entire area, and identification of integral portions of this settlement area, such as the locus of activity and different activity areas, may be possible.

The following questions are suggested as possible research orientations for further intensive archaeological investigations:

- (1) What was the prehistoric environment like, and how does it relate to the present environment?
- (2) What sort of population inhabited the area?
- (3) What are the interrelationships among the sites?
- (4) What is the relationship between the prehistoric and historic occupation of the area?
- (5) Are there any significant differences from the adjoining areas that are not discernible from the surface data, but are indicated by the subsurface record?
- (6) What was the relationship of this particular area to the rest of the settlement area?

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


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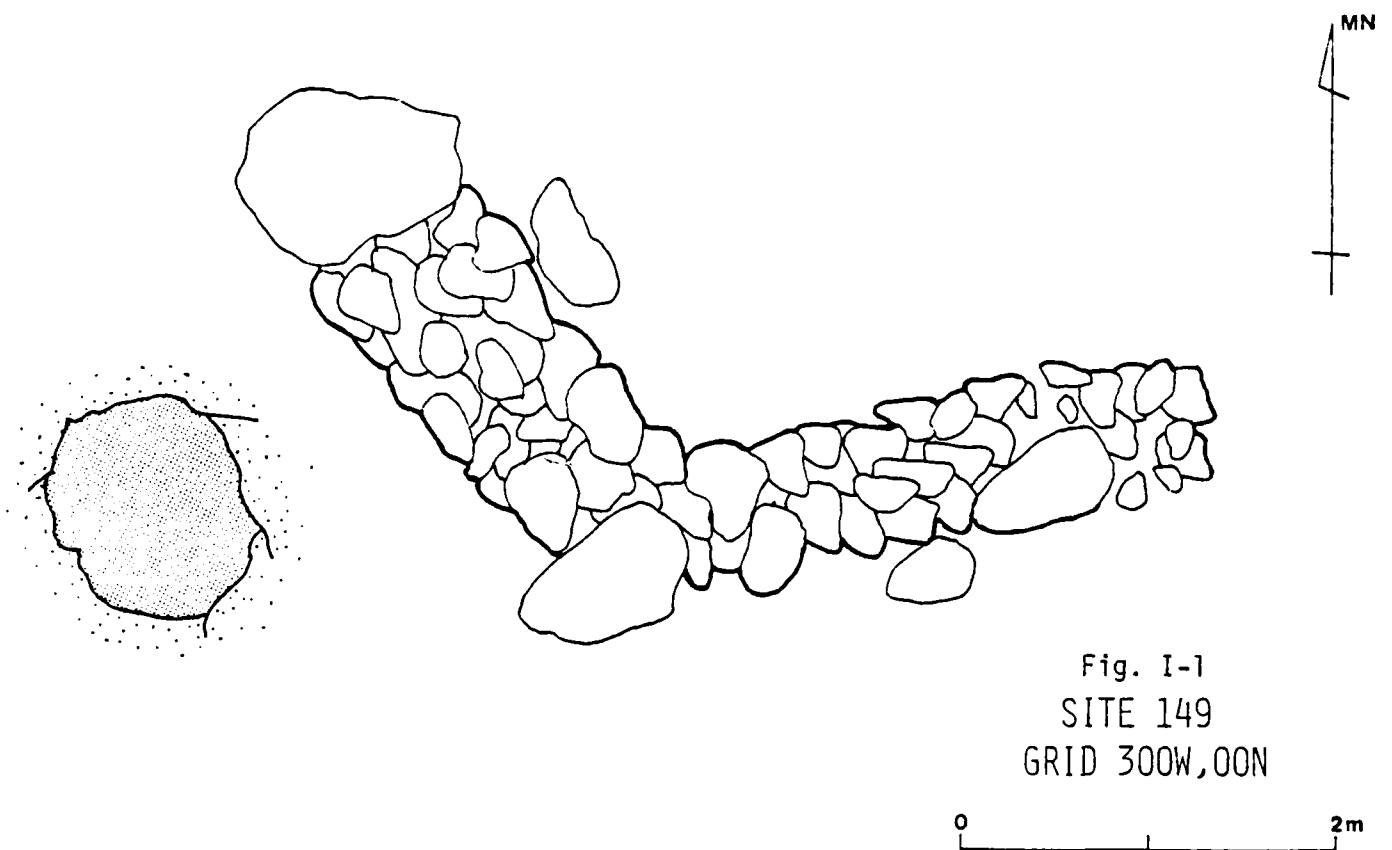
APPENDIX I

This appendix contains plan-view figures of all of the archaeological sites described in the text and photographs of feature types which are considered representative or typical of those in the New Disposal Sites area.

All site numbers are prefixed by: 50-Oa-B6-

## KEY TO SYMBOLS

-  - SINKHOLE
-  - FILLED SINKHOLE
-  - FACING
-  - UPRIGHT SLAB
-  - FALLEN UPRIGHT
-  - BEDROCK



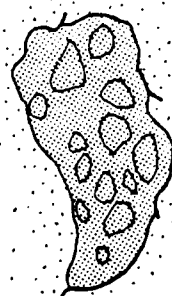
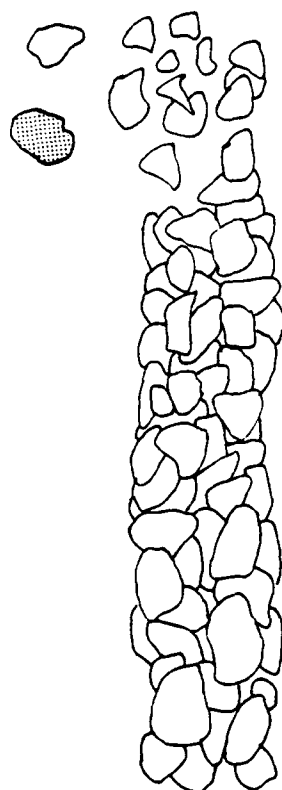


Fig. I-2a  
SITE 150  
GRID 200W,00N



Fig. I-2b. SITE 36-100, D-SHAPE. View from SW.

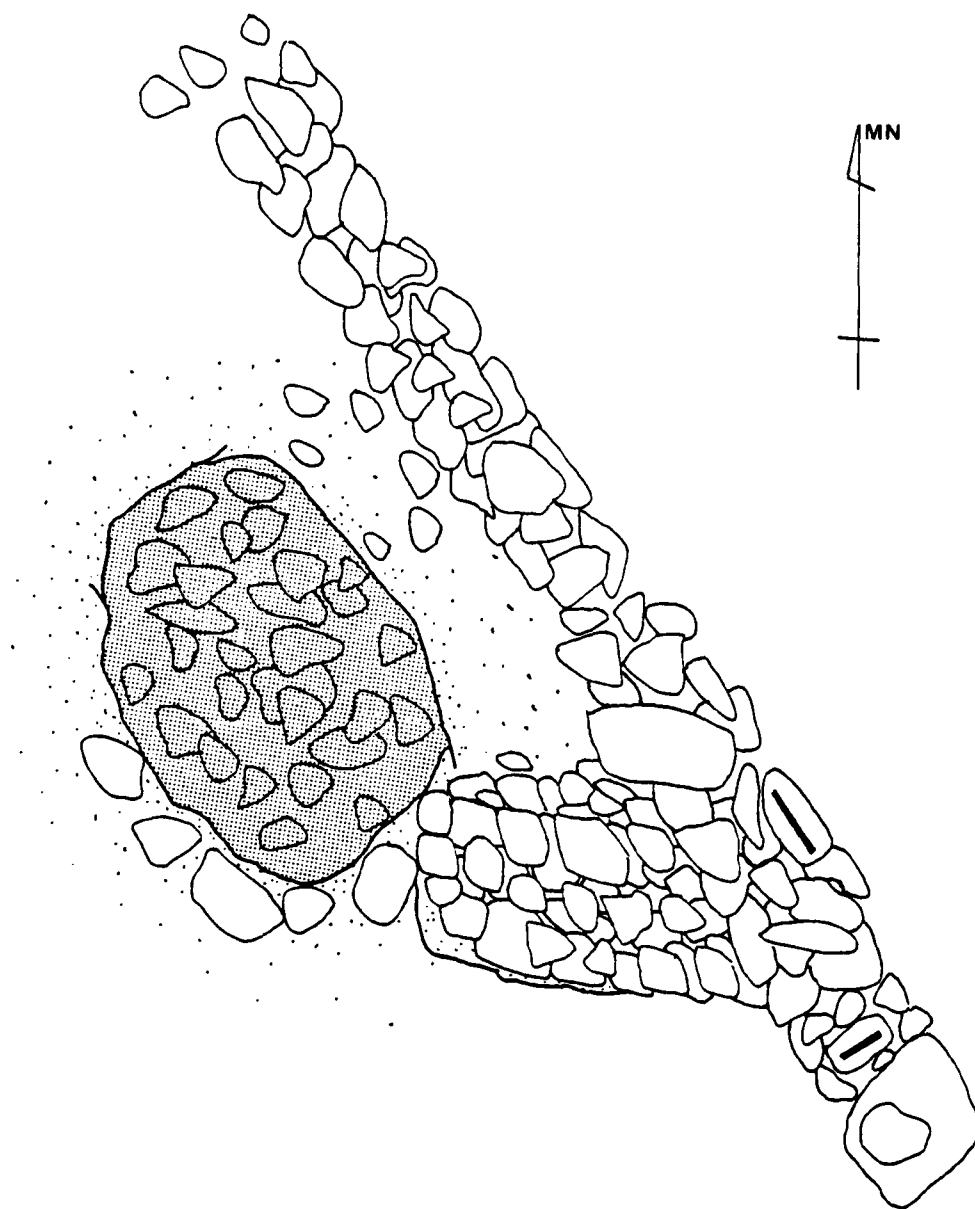


Fig. I-3  
SITE 151  
GRID 200W, 00N

0 2m

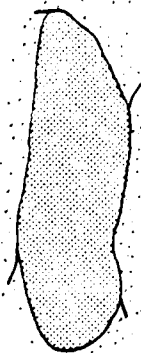
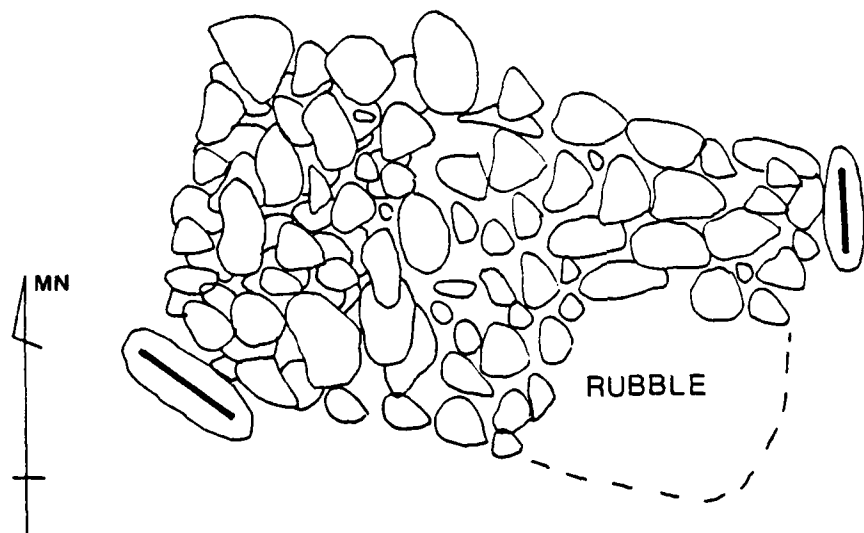


Fig. I-4  
SITE 152  
GRID 200W,00N

0 2m

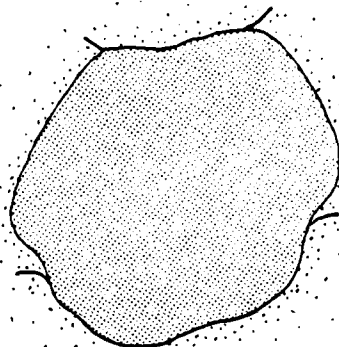
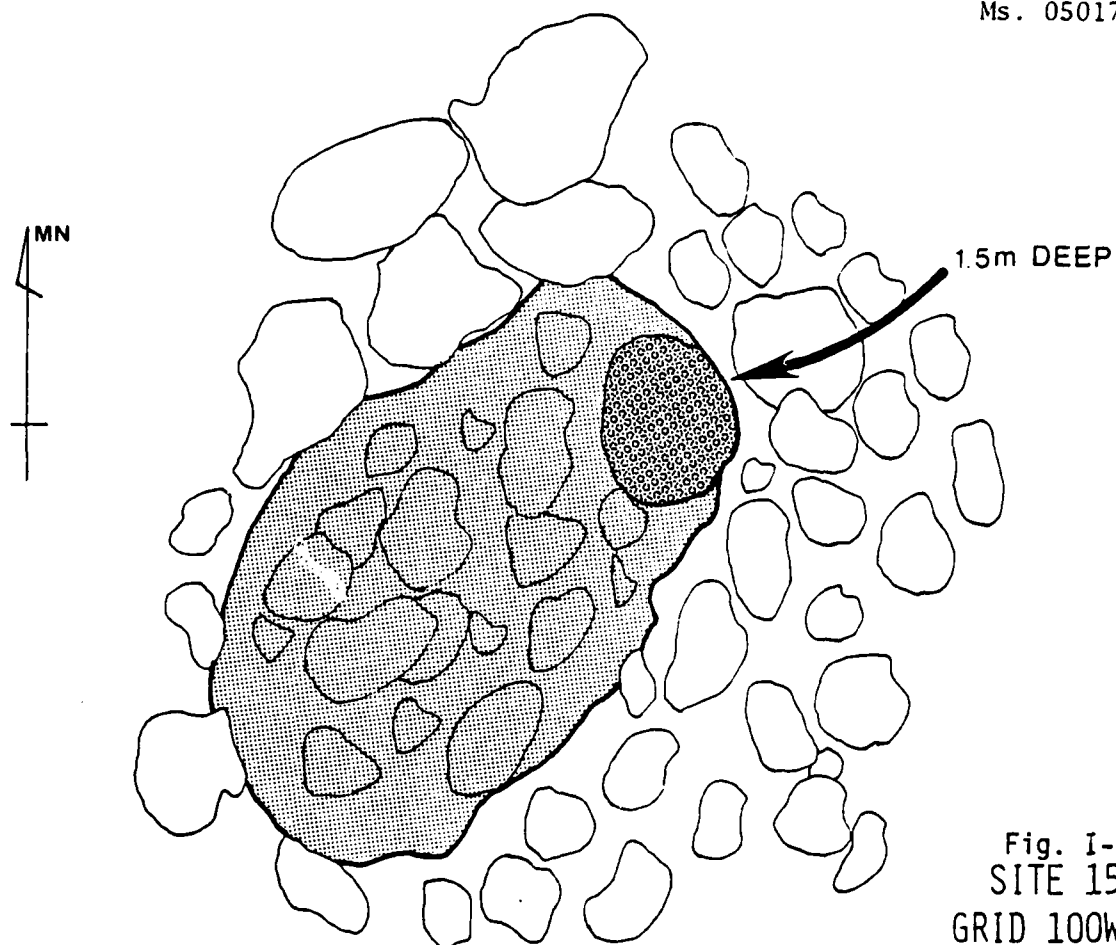
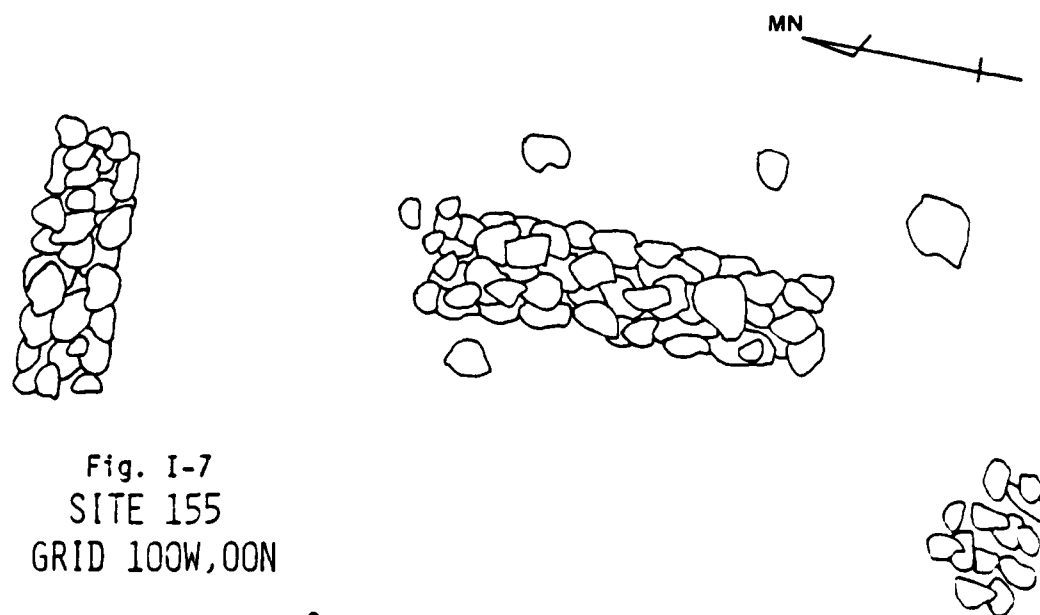


Fig. I-5  
SITE 153  
GRID 200W,00N

0 2m



0 1m



0 3m

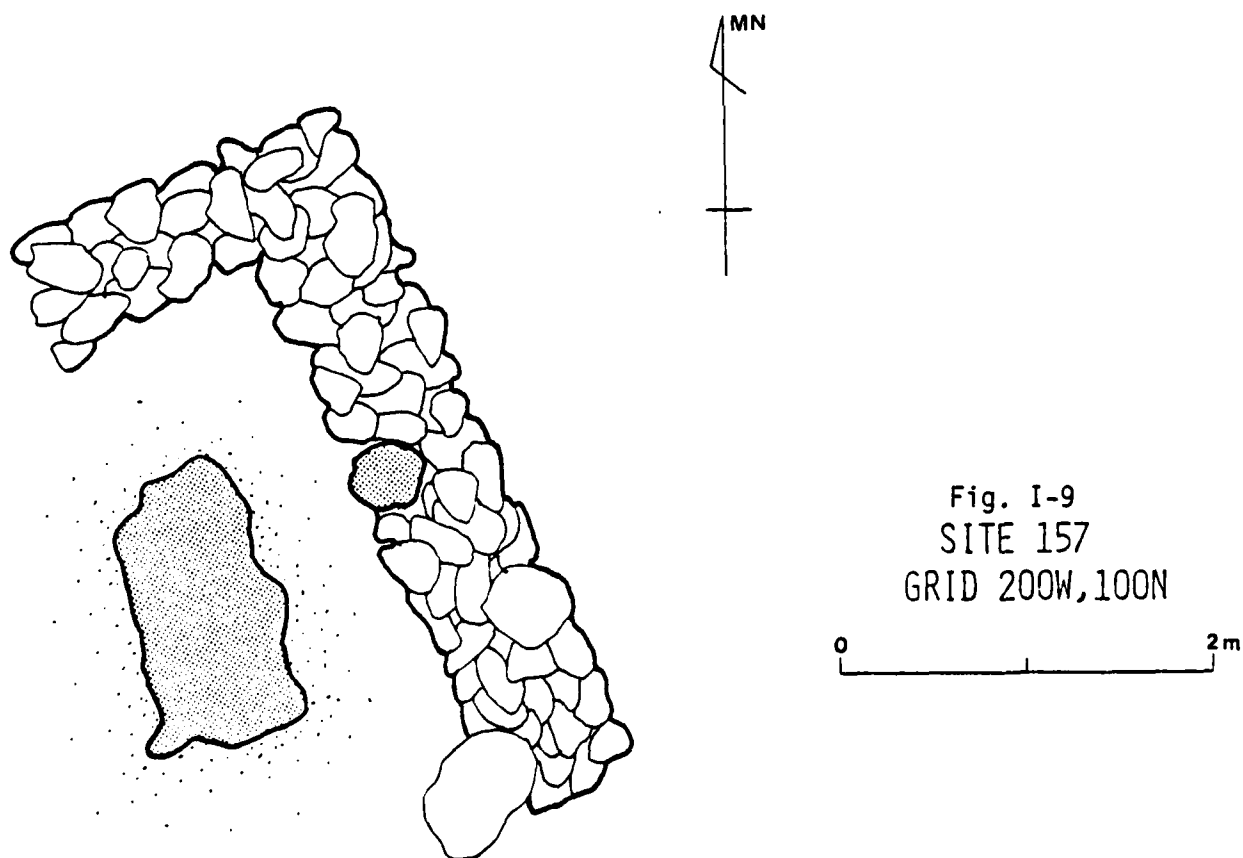
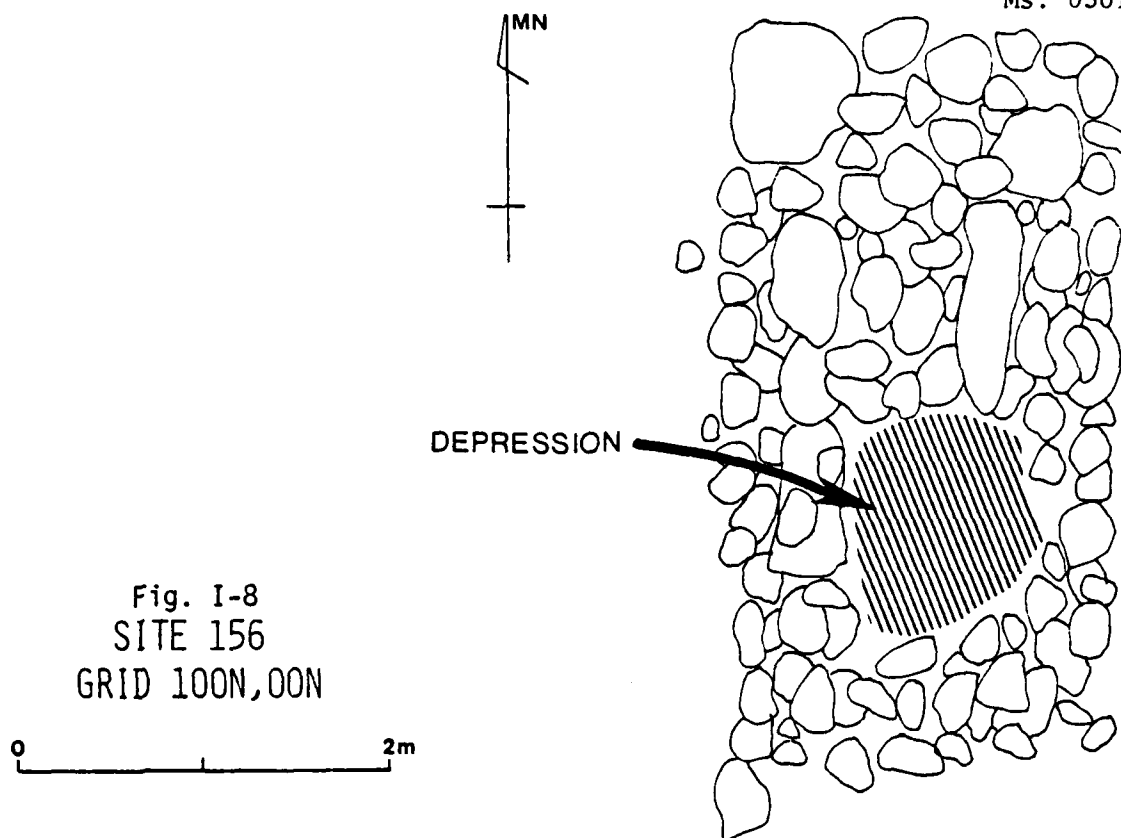




Fig. I-10. SITE B6-157, L-SHAPE. View from SW.

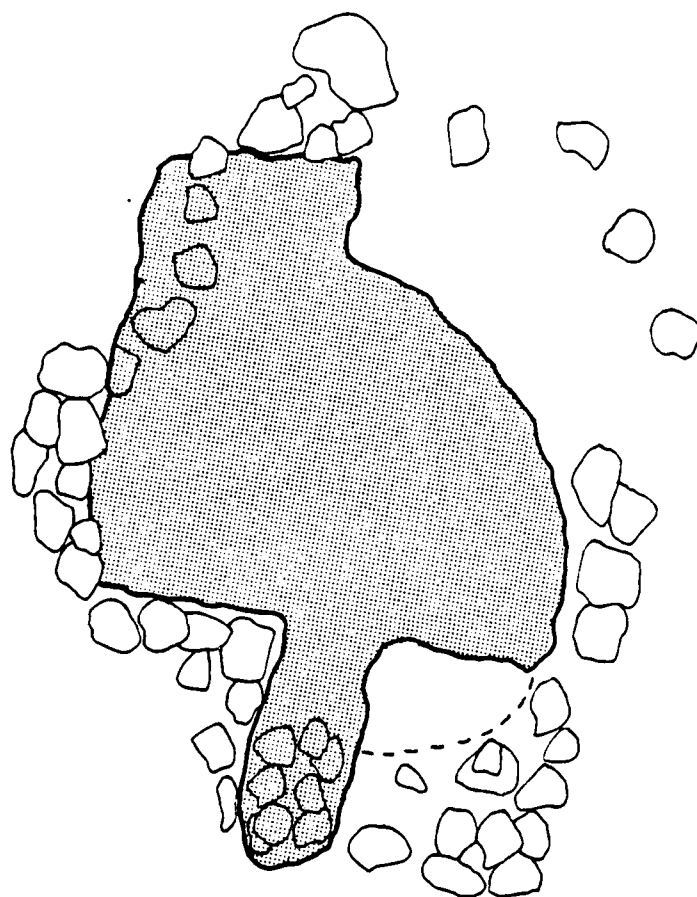


Fig. I-11  
SITE 153  
GRID 200W, 100N

0 2m

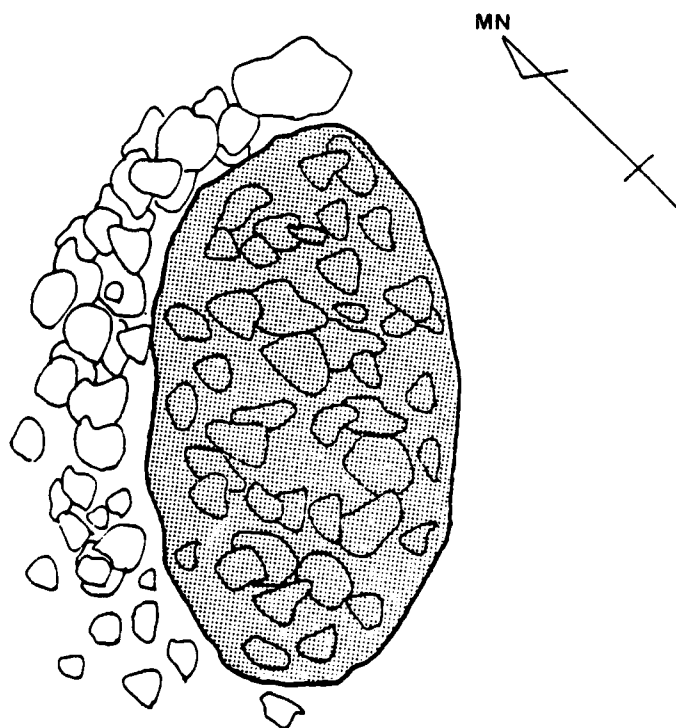


Fig. I-12  
SITE 159  
GRID 200W, 100N

0 2m



Fig. I-13. SITE B6-158, MODIFIED SINK. View from N.

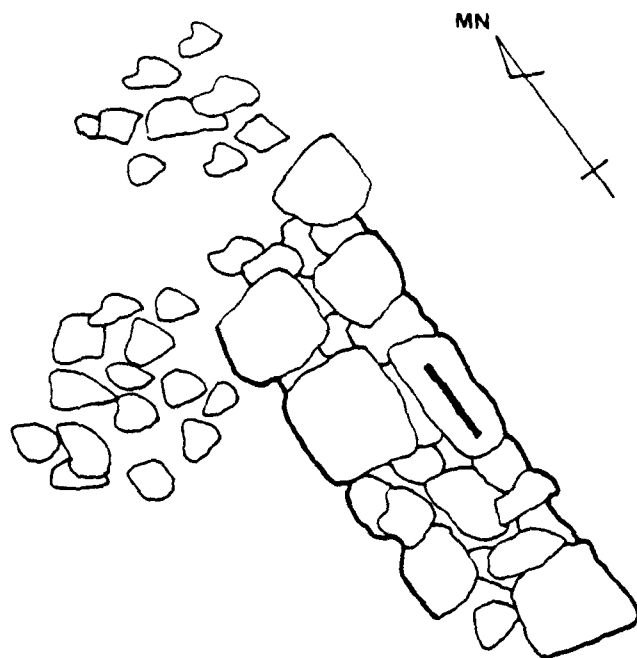


Fig. I-14  
SITE 160  
GRID 200W,100N

0 2m

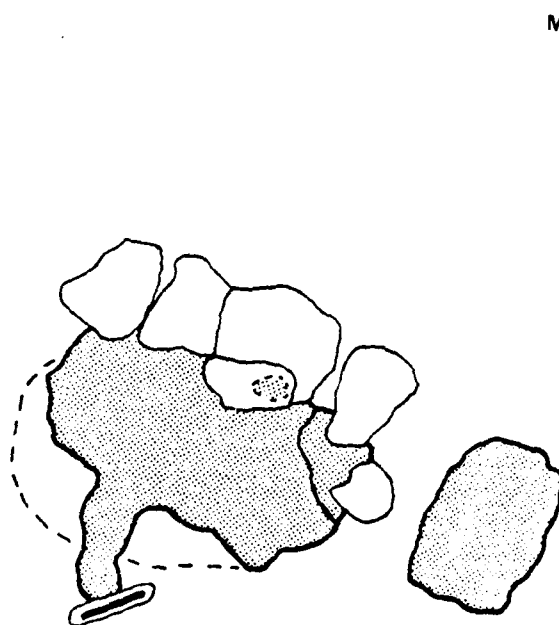


Fig. I-15  
SITE 161  
GRID 200W,200N

0 2m

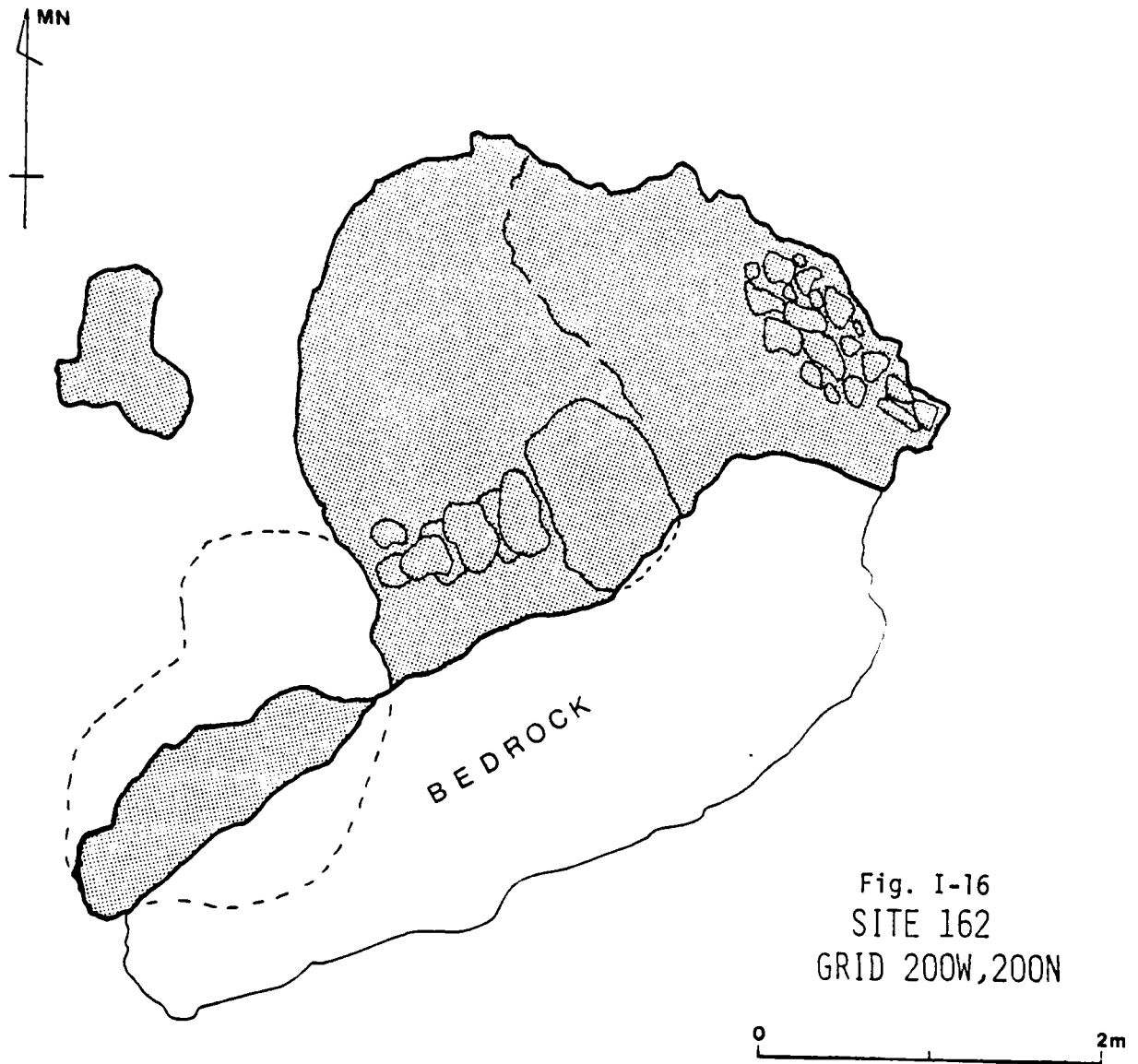


Fig. I-16  
SITE 162  
GRID 200W, 200N



Fig. I-17. SITE B6-162, LARGE HABITATION SINK.  
Sign placed on ceiling of overhang shelter.  
View from NW.

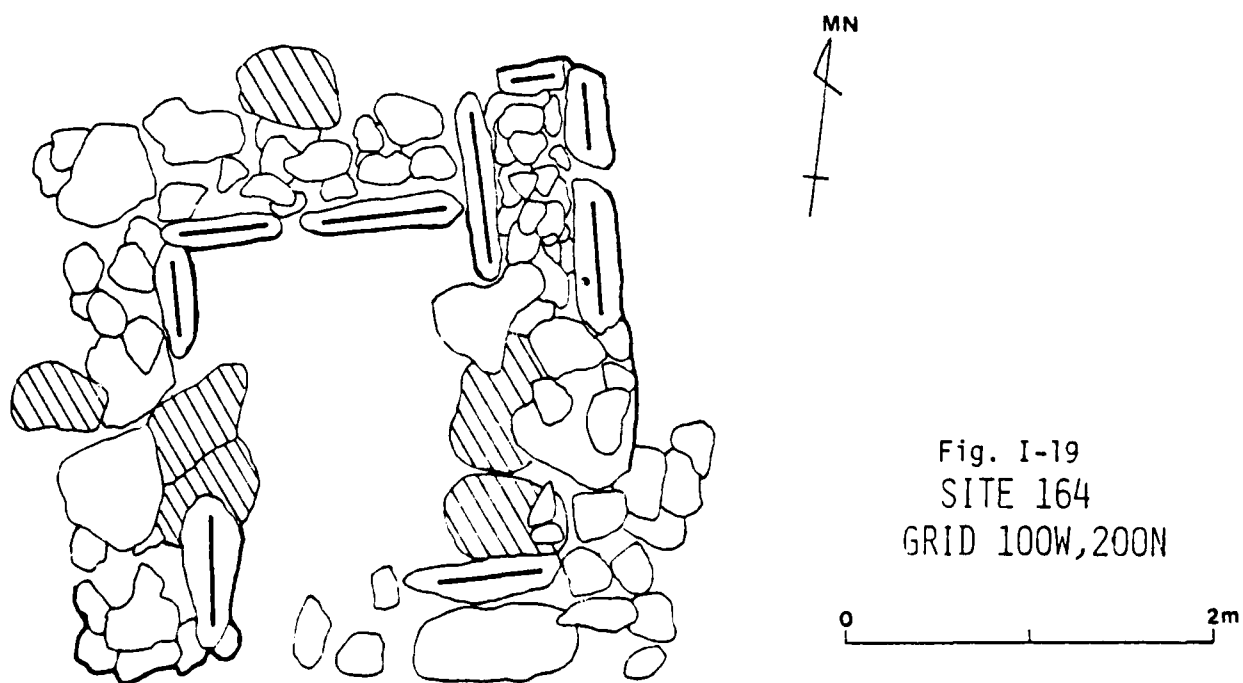
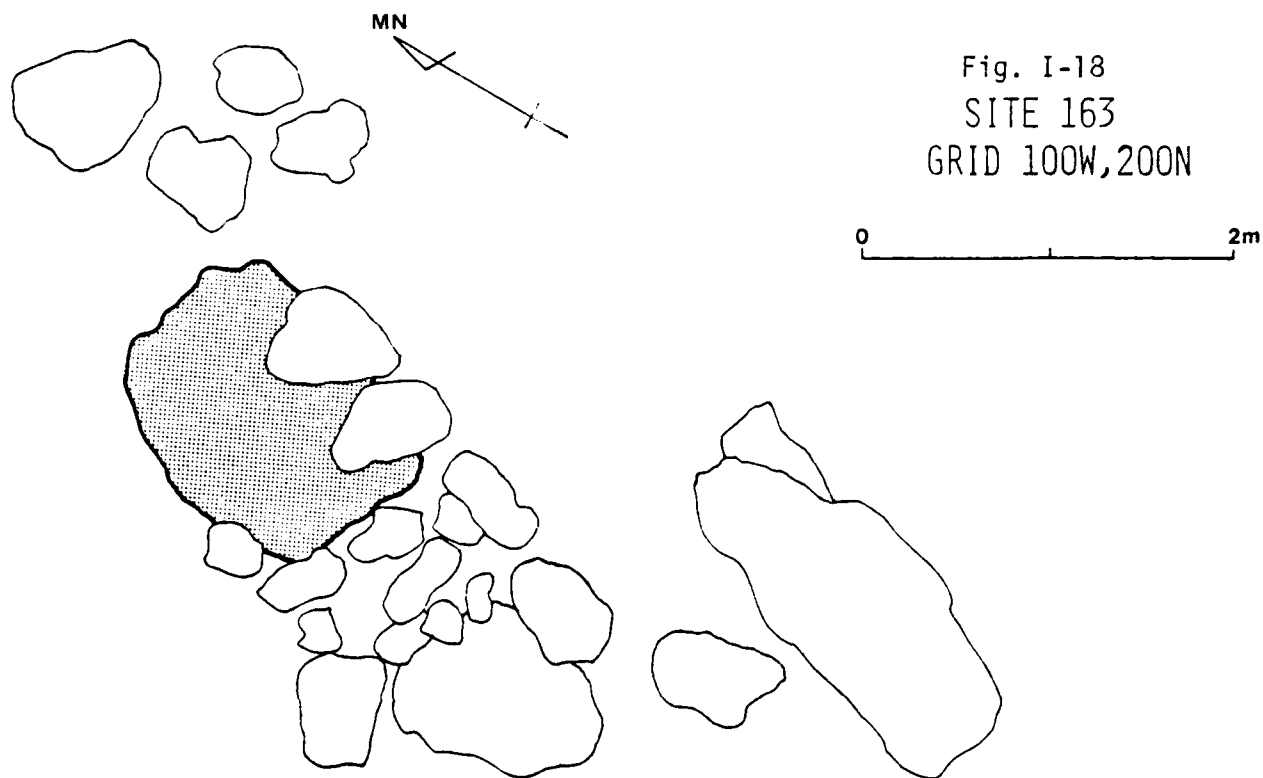




Fig. I-20a. SITE B6-164, RECTANGULAR ENCLOSURE. Sign placed near opening. View from S.



Fig. I-20b. SITE B6-164, SHOWING INTACT NE CORNER CONSTRUCTION WITH LARGE UPRIGHT SLABS. View from NE.

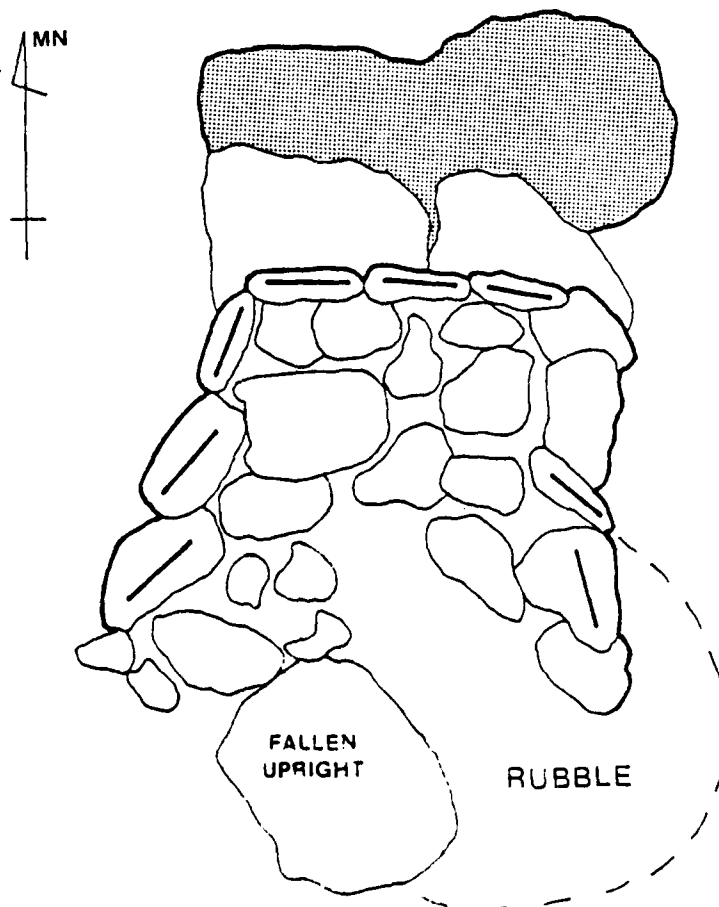
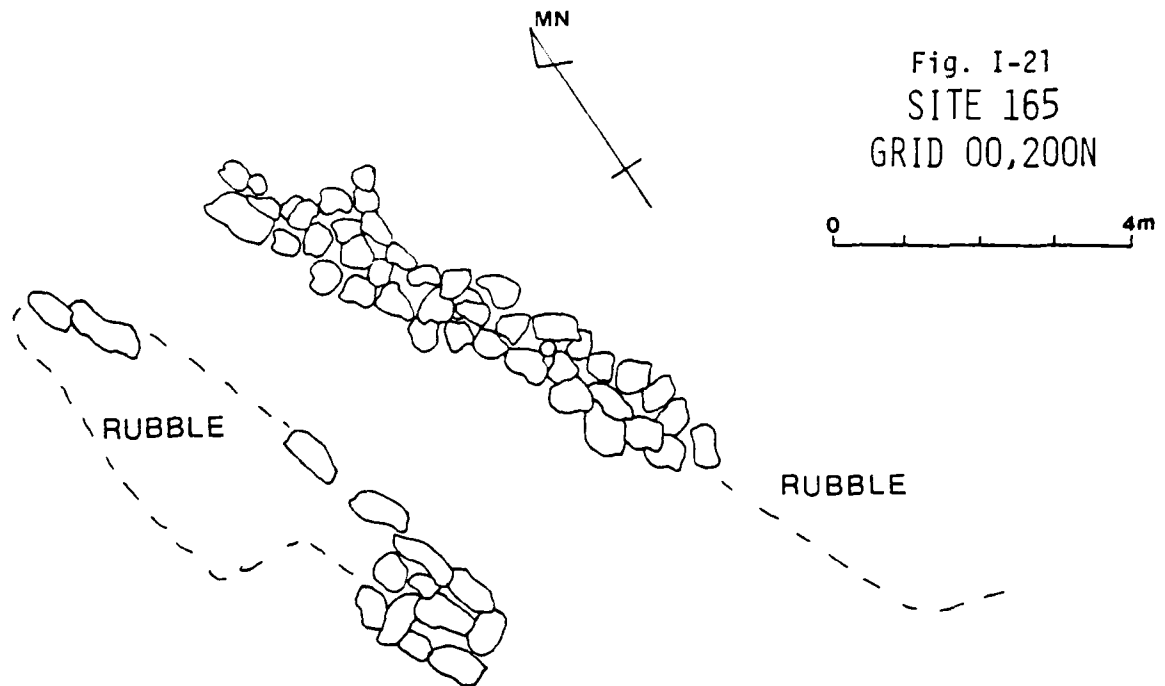


Fig. I-22  
SITE 166  
GRID 00,100N



Fig. I-23. SITE B6-166, PLATFORM. View from SW.

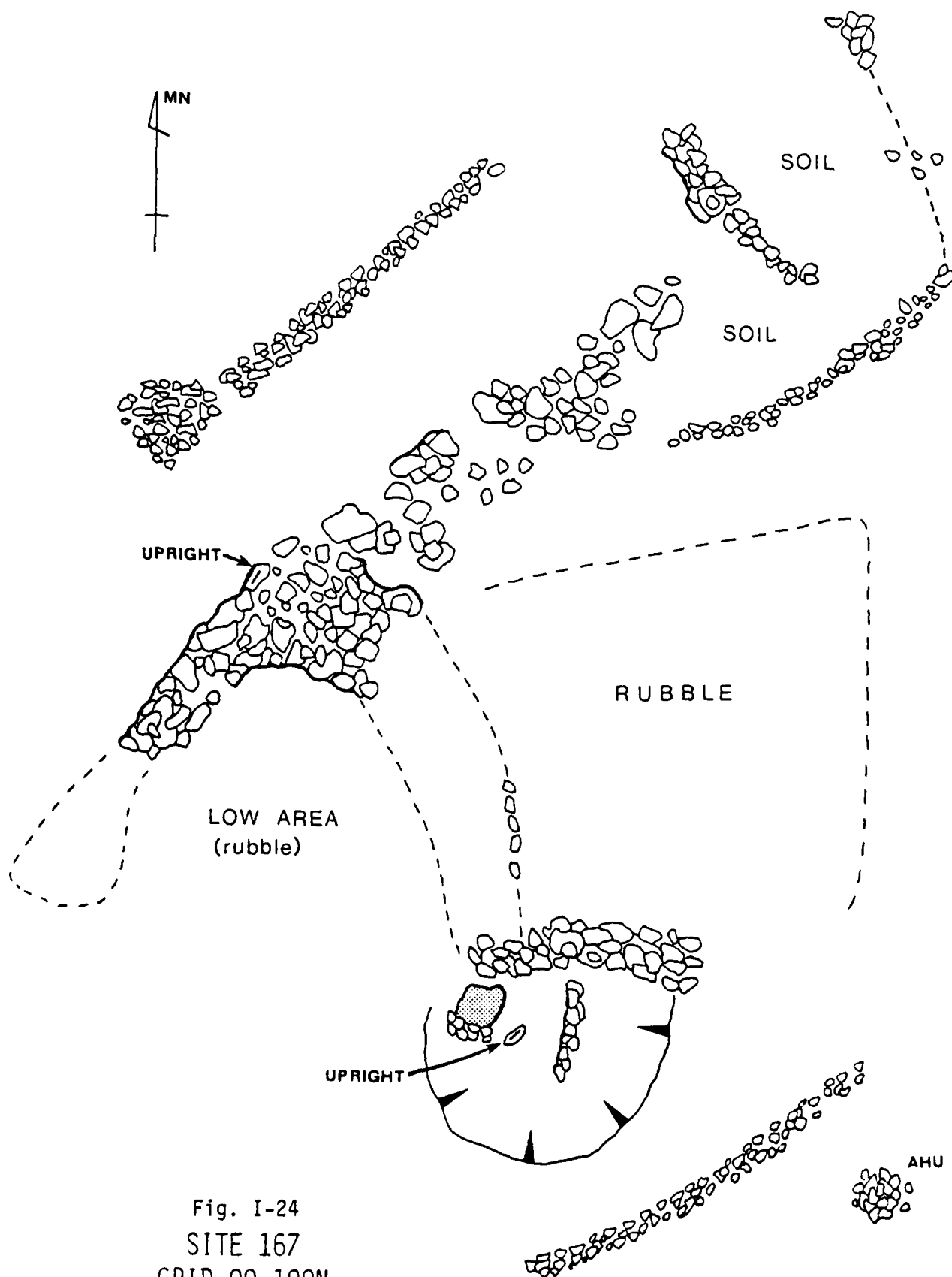


Fig. I-24  
SITE 167  
GRID 00,100N



Fig. I-25. SITE B6-167, WESTERN SECTION OF POSSIBLE AGRICULTURAL COMPLEX.  
View from W.

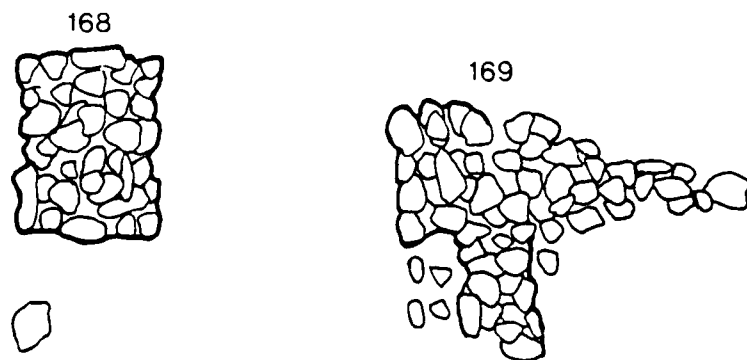


Fig. I-26  
SITES 168 & 169  
GRID 100E, 100N

0 2m

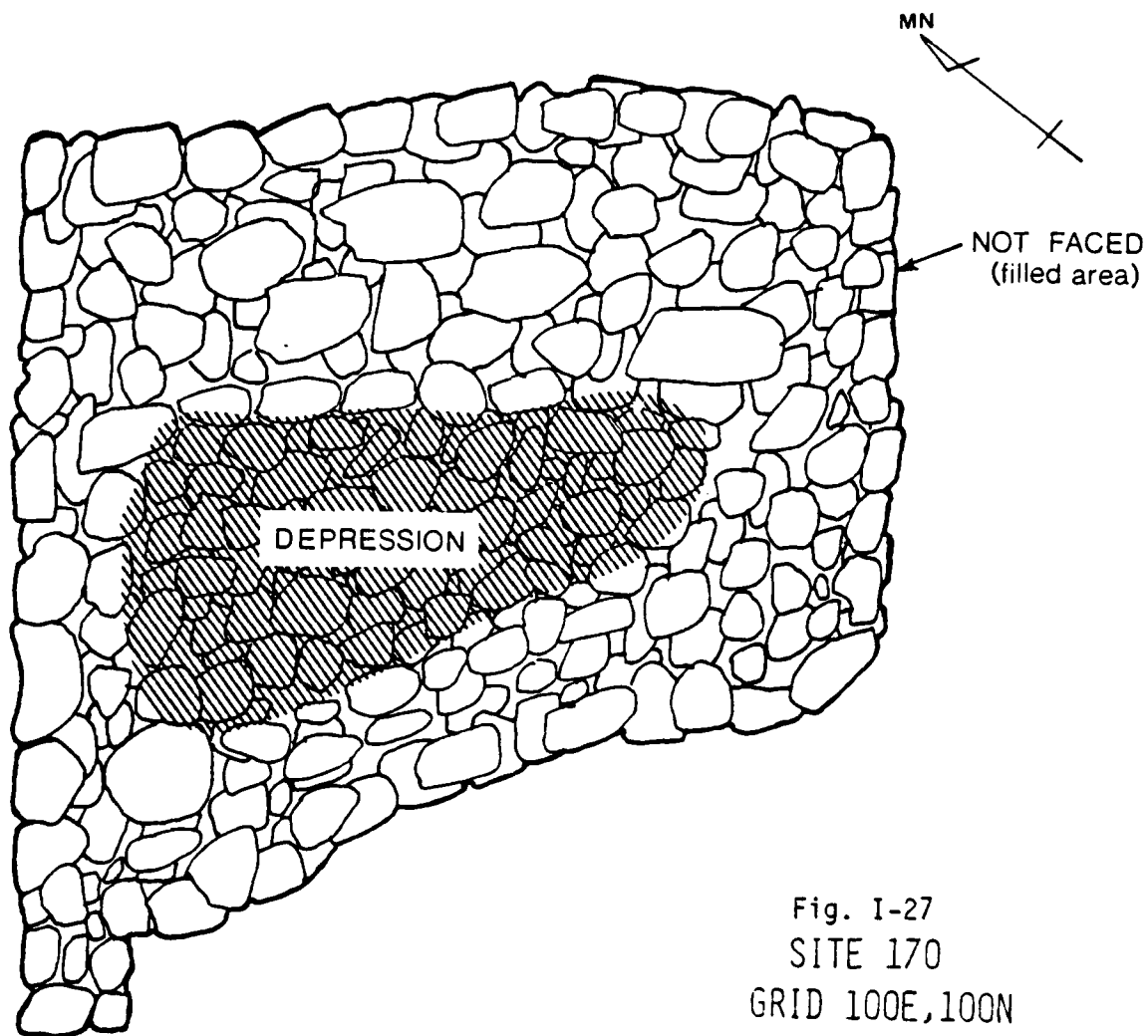


Fig. I-27  
SITE 170  
GRID 100E, 100N

0 2m



Fig. I-28. SITE B6-170, FILLED/PAVED AREA. Note central depressed area. View from S.

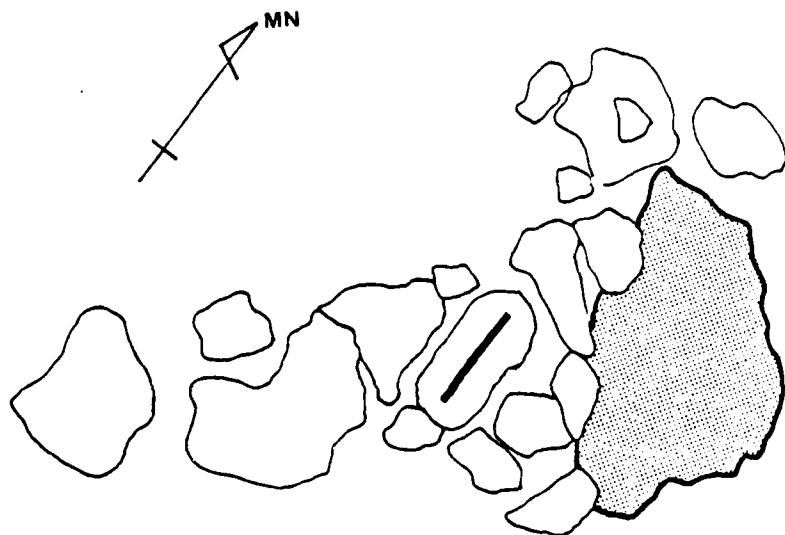


Fig. I-29  
SITE 171  
GRID 100W,00N

0 1m

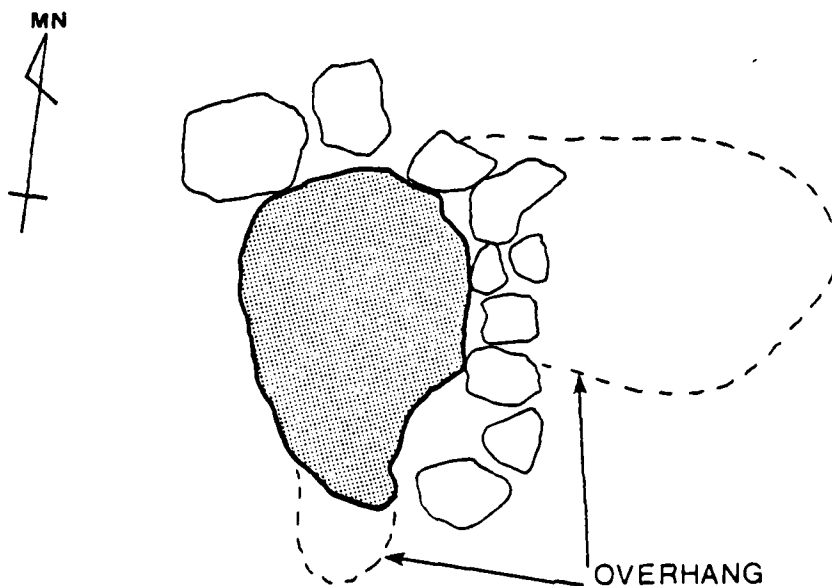


Fig. I-30  
SITE 172  
GRID 100W,00N

0 2m



Fig. I-31. SITE B6-172, POSSIBLE SMALL HABITATION SINK.  
Note sink rim modification. View from SW.

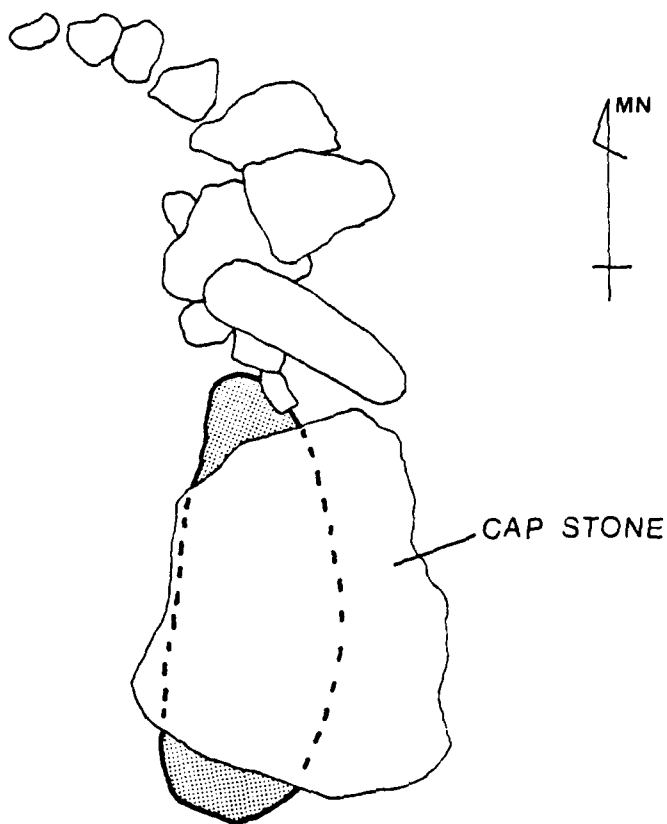


Fig. I-32  
SITE 173  
GRID 100E,00N



DIRT  
ROAD

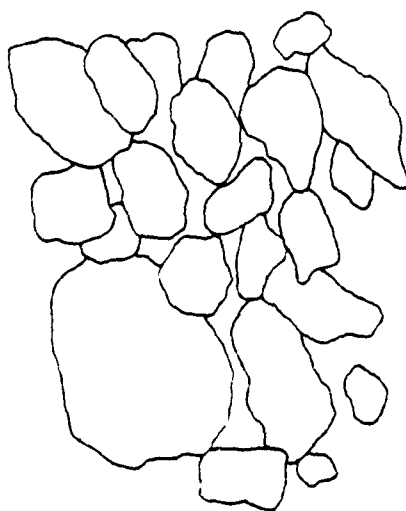


Fig. I-33  
SITE 174  
GRID 200E,00N



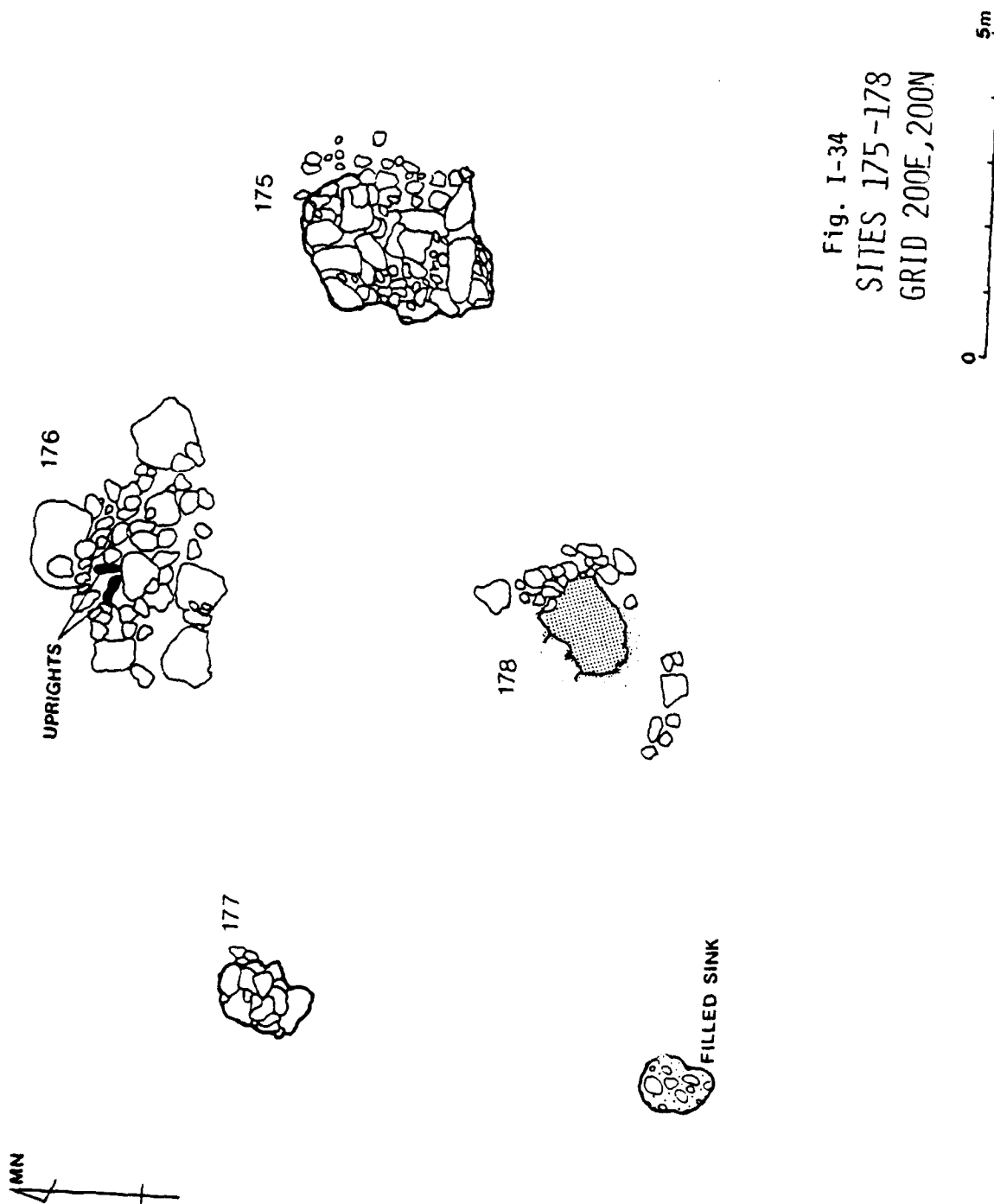




Fig. I-35. SITE B6-175, AHU. View from SE.

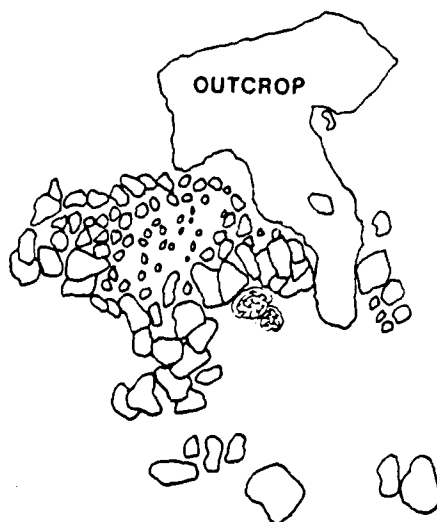


Fig. I-36  
SITE 179  
GRID 200E,100M

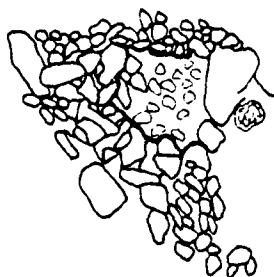


Fig. I-37  
SITE 180  
GRID 300E,200N



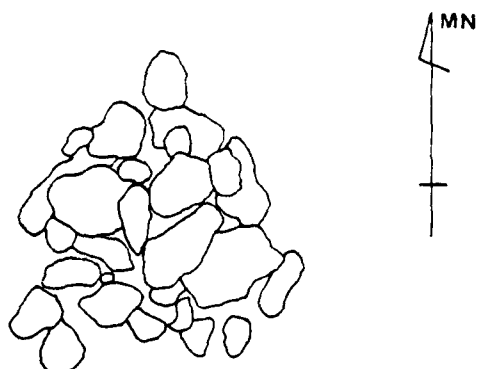


Fig. I-38  
SITE 181  
GRID 300E, 100N

0 2m

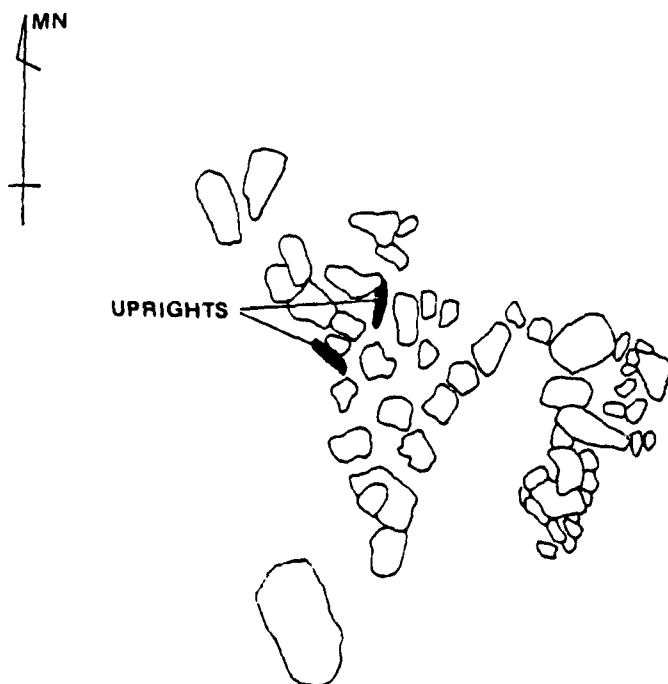


Fig. I-39  
SITE 182  
GRID 300E, 100N

0 4m

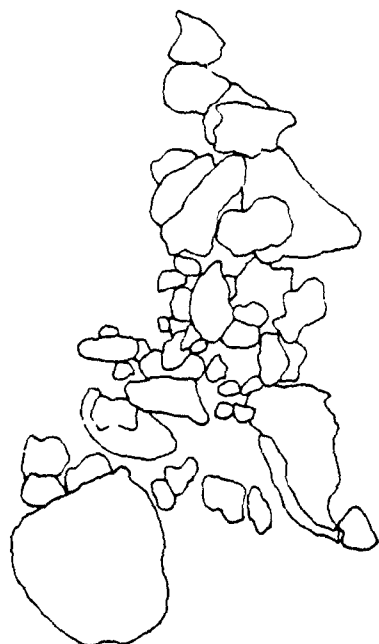


Fig. I-40  
SITE 183  
GRID 300E, 100N

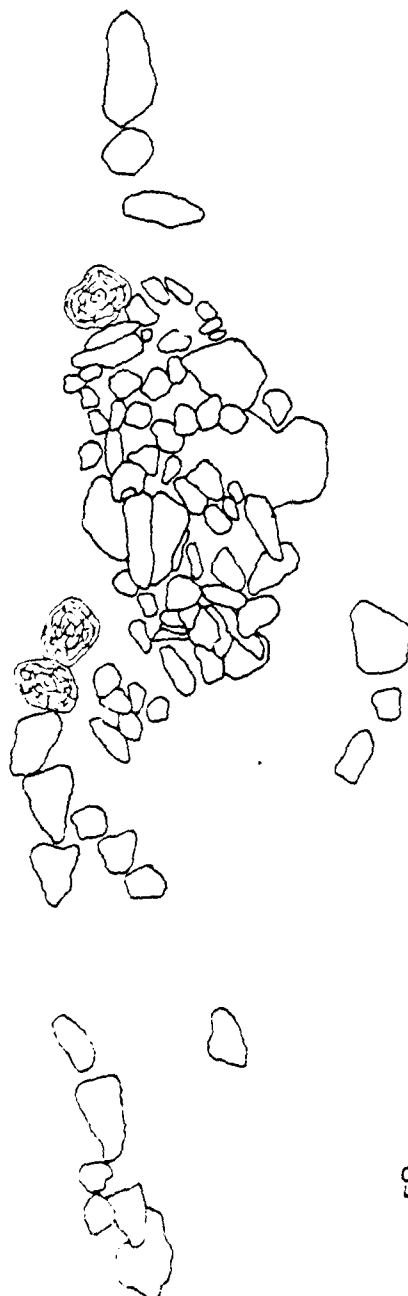
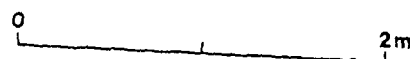


Fig. I-41  
SITE 184  
GRID 300E, 100N



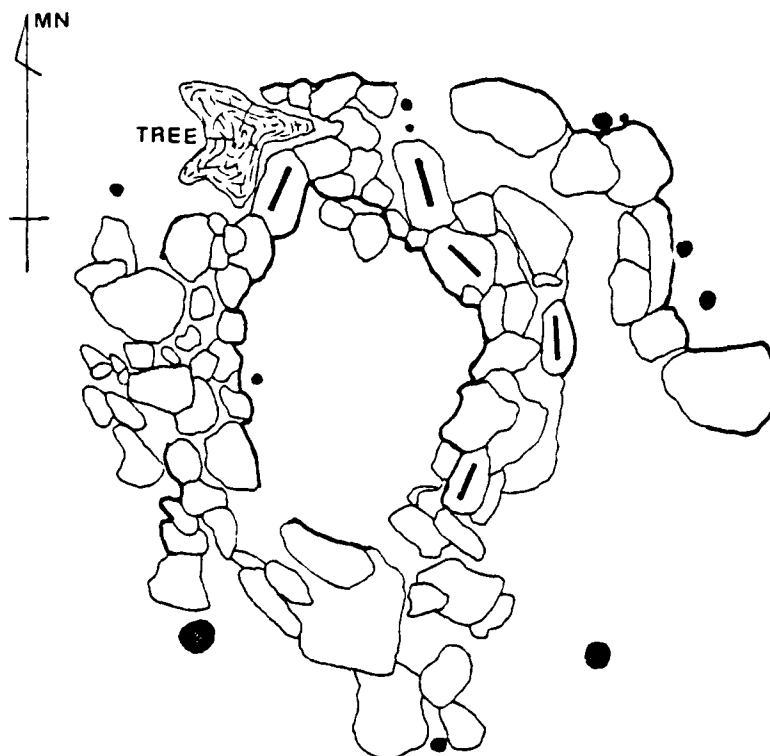


Fig. I-42  
SITE 185  
GRID 300E,100N

● TREES

0 2m

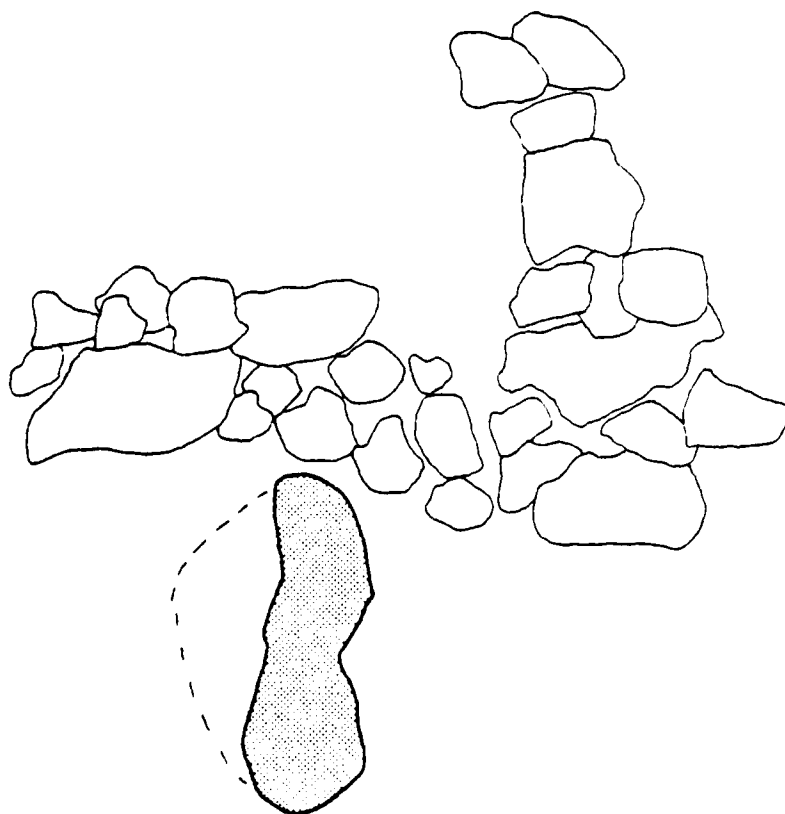


Fig. I-43  
SITE 186  
GRID 300E,100N

0 2m



Fig. I-44. SITE B6-185, CIRCULAR ENCLOSURE. View from W.

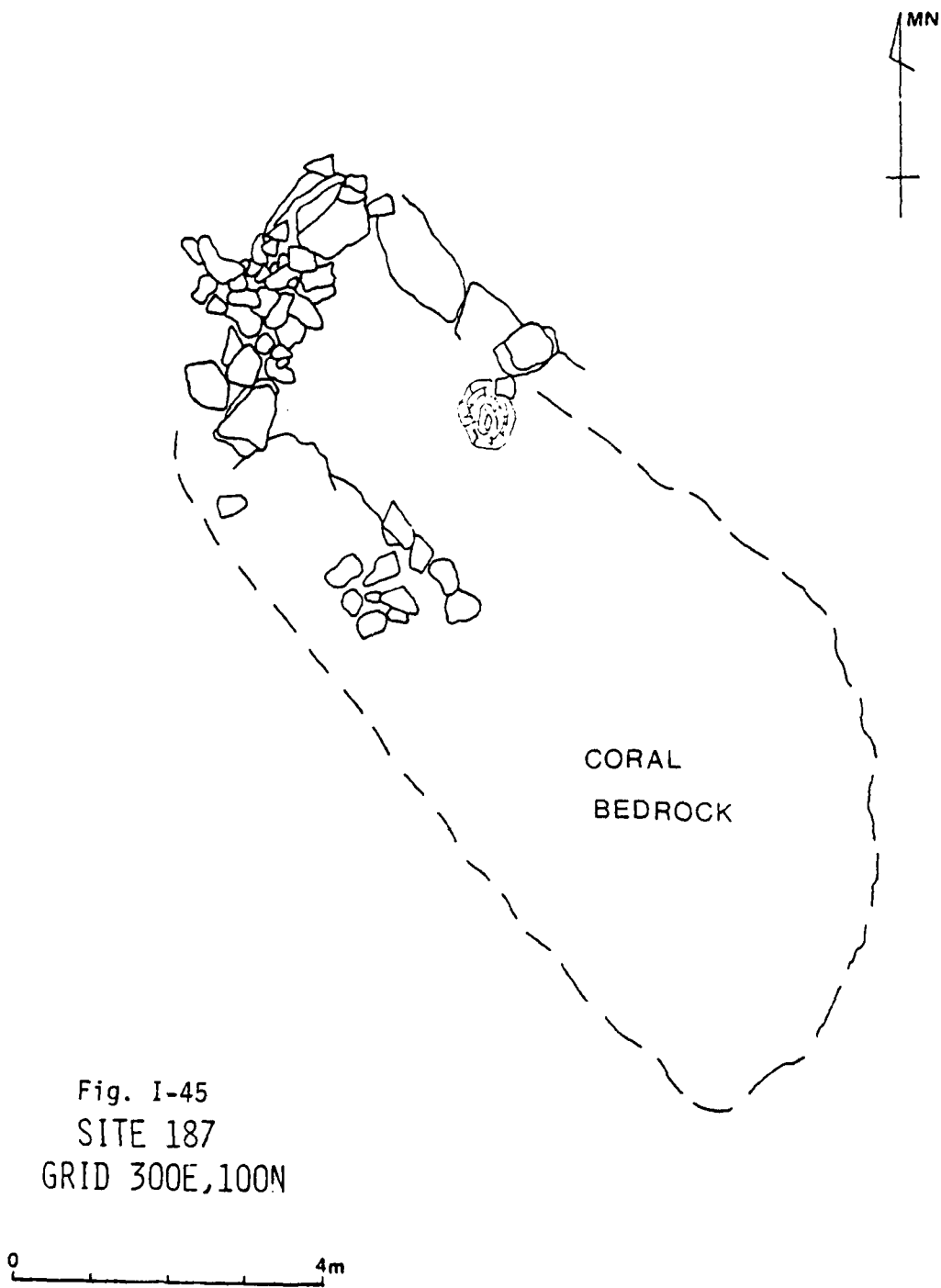


Fig. I-45  
SITE 187  
GRID 300E,100N

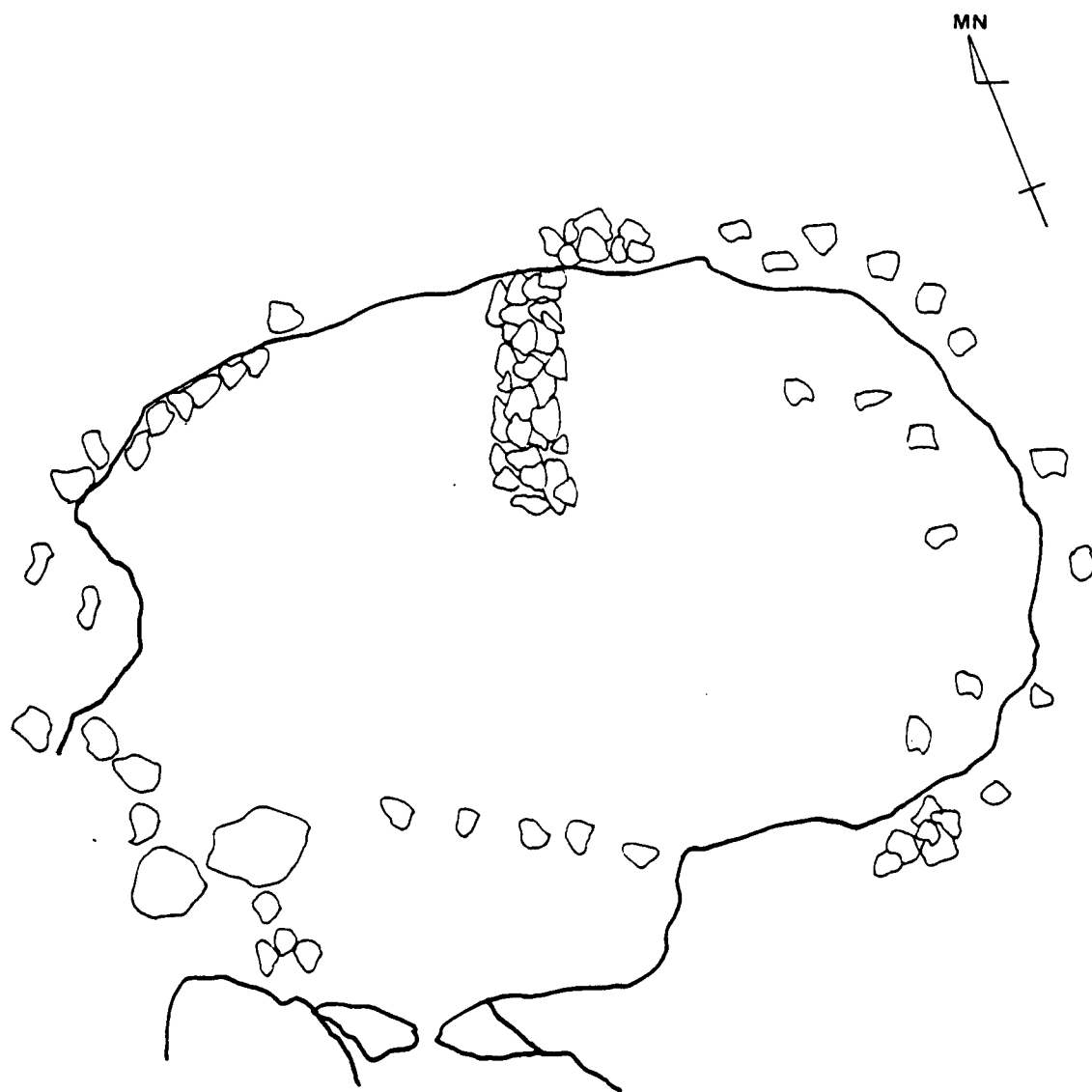


Fig. I-46  
SITE 188  
GRID 00E,300N

0 3m

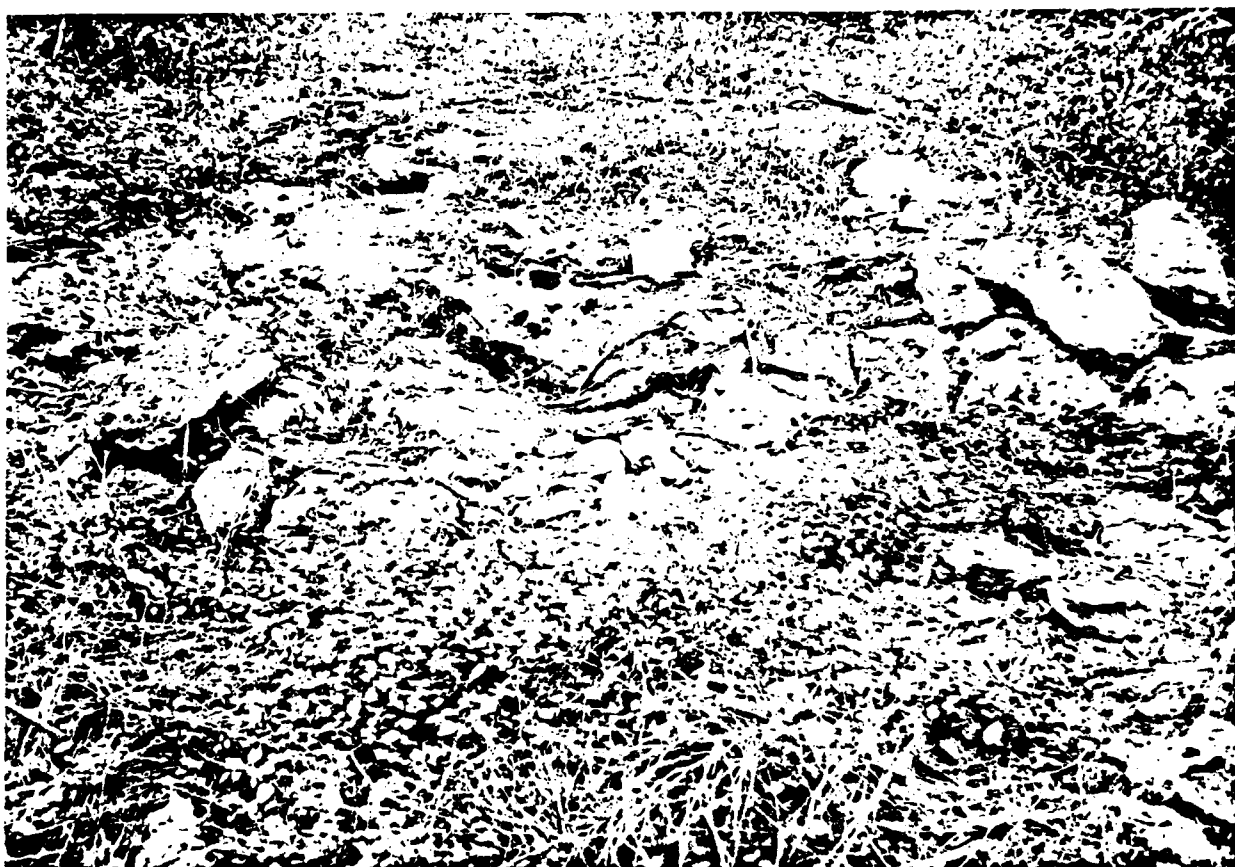


Fig. I-47. SITE B6-188, MODIFIED DEPRESSION. View from SW.



Fig. I-48. SITE B6-204, PALEONTOLOGICAL TEST SINK. Typical shallow unmodified sink. View from SE.



Fig. I-49. TYPICAL DEEP PALEONTOLOGICAL SINKHOLE.  
View from W.



Fig. I-50. TI (CORDYLINE TERMINALIS) PLANTS GROWING  
OUT OF SINKHOLE IN GRID AREA 200E/100N. View from  
NE.

APPENDIX II

PRELIMINARY IDENTIFICATION OF  
PALEONTOLOGICAL MATERIAL

**BERNICE P. BISHOP MUSEUM***P. O. Box 6037, Honolulu, Hawaii 96818 • Telephone 847 3511*MEMORANDUM

DATE: 21 April 1979

TO: Aki Sinoto, Department of Anthropology, Bishop Museum

FROM: Carla H. Kishinami, Division of Vertebrate Zoology, Bishop Museum

SUBJECT: Identification of Barber's Point (1979) Bone Material.

In identifying this material, I have separated out the bird bone and placed the remainder of the faunal material in bags marked "Vertebrate other than bird", making no attempt to identify this material further. These bags will be returned to you along with this memo.

The bird bone has been identified according to the categories listed below. I have been able to come no closer to identification of genera and species than is indicated in the category names. When I mention genera or species in the explanations of the categories, unless it is obviously indicated otherwise, I intend the common or scientific names only to help convey an idea of the general size of the bird represented. Also, except in the case of Pterodroma phaeopygia (see below), each time I refer a bone or bones (e.g., "cf. small passeriform") to a certain species, genus, or category of bird, I would estimate that there is a 75% (or better) chance of the bones belonging to the category (or species, genus, etc.) indicated.

The bird bones will be catalogued into the Vertebrate Zoology Catalogue and xeroxed copies of the catalogue cards will be made available to you as soon as possible. These bones will eventually be sent to Storrs Olson of the National Museum of Natural History for further identification.

If you need any information I have not yet supplied (further explanations of bird identifications or further identifications of non-avian material, etc.) please let me know and I will be happy to supply you with it. Also, if it is at all possible, I would appreciate a chance to see the portion of any report or MS dealing with these bones, solely so that I might prevent any possible misinterpretation of my remarks, identifications, or the like.

I hope I have been some help to you. Thank you for letting me see these bones.

## Categories used:

Pterodroma phaeopygia (Dark-rumped Petrel) . Several bones are certainly this species; others are referred to it, and in this case, when I use the "cf.", I would estimate that there is a 90% (or better) chance of the bones belonging to this species.

(more)

(MEMO: Sinoto from Kishinami, 21 April 1979, p. 2.)

- cf. medium procellariid . . . . . probably a member of the family Procellariidae; in size range of Dark-rumped Petrel and Wedge-tailed Shearwater.
- cf. Oceanodroma sp. (Storm Petrel) . Only one bone fragment of a very small non-passeriform; looks most like a member of the family Hydrobatidae in the size range of Harcourt's Storm Petrel.
- Nycticorax nycticorax (Black-crowned Night Heron) . A fairly complete skeleton of a single specimen.
- cf. Fluvialis dominica (American Golden Plover) . One bone.
- Streptopelia chinensis (Lace-necked Dove) . One bone.
- cf. small non-passeriform . . . . . one bone of a bird in the size range of a small Storm Petrel or Semipalmated Plover.
- small passeriform . . . . . a member of the Order Passeriformes; in size range of Japanese White-eye, English Sparrow, Brazilian Cardinal, etc.
- medium passeriform . . . . . in size range of the Common Mynah; one or more bones in this category possibly belong to an extinct species.
- small bird . . . . . in size range of sparrow, plover, storm petrel, etc.
- medium bird . . . . . in size range of pigeon, petrel, shearwater, etc.
- large bird . . . . . two bones; in size range of crow, heron, booby, etc.
- cf. bird . . . . . bone fragments.

# # # # #

*The materials included in this catalogue have undergone all necessary processing and preliminary analysis. It will be forwarded to Dr. Storrs Olson on May 2, 1979, for further analysis and formal identification.*

Table 6.

Conversion Table for Temporary Test Sink (TS) Numbers and Permanent Bishop Museum Site Numbers.

<u>GRID</u>	<u>TS#</u>	<u>BM SITE #</u> <u>(50-0a-B6-)</u>
400W/00N	1	189
400W/100N	22	190
300W/00N	4	191
300W/100N	6	192
300W/200N	3	193
200W/00N	24	194
200W/100N	28	195
200W/200N	32	196
200W/300N	1	197
100W/00N	7	198
100W/100N	8	199
100W/200N	33	200
100W/300N	10	201
00/00N	4	202
00/100N	9	203
00/200N	3	204
100E/00N	1	205
100E/100N	2	206
200E/00N	8	207
200E/100N	13	208
200E/200N	1	209
300E/00N	7	210
300E/00N	16	211
300E/100N	5	212

ACC N No.

DATE OF ENTRY

21 APR. 1971

ENTERED BY

C. H. KISHIMOTO

Honolulu, Hawaii

GENERAL LOCALITY

Hawaii: Oahu

BBM-X	ORIG. NO.	IDENTIFICATION	SEX	DATE	COLLECTOR	EXACT LOCALITY
1 LOT OF 2 Bone Frag. Only 156708	15-23 Mch 1973	"cf. bird"	-	1973	A. Sinoto et al.	2.5 km N. Barber's Point, 32 m. b.s. Mus. Arch. Grid CCE/CCN.
1 CARPOMETACARPAL FRAG. ONLY 156709	15-23 Mch 1973	"cf. medium procellariid"	-	"	"	"
1 RADIUS FRAG. ONLY 156710	15-23 Mch 1973	"medium bird"	-	"	"	2.5 km N. Barber's Point, 32 m. b.s. Mus. Arch. Grid CCE/CCN.
1 Vert. Frag. Only 156711	"	"	-	"	"	"
1 Vert. Frag. Only 156712	"	"	-	"	"	"
1 Vert. Frag. Only 156713	"	"	-	"	"	"
1 Vert. Frag. Only 156714	"	"	-	"	"	"
1 Rib Only 156715	"	"	-	"	"	"
1 Pterom. Tibiotarsus Frag. Only 156716	"	"cf. Pterodroma Phaeopygia"	-	"	"	"
1 Lot of 4 Bone Frag. Only 156717	"	"cf. bird"	-	"	"	"
1 Pterometatarsus Frag. Only 156718	15-23 Mch 1973	"cf. Oceanodroma sp."	-	1973	A. Sinoto et al.	2.5 km N. Barber's Point, 32 m. b.s. Mus. Arch. Grid CCE/CCN.
1 Sternum Frag. Only 156719	"	"small passeriform"	-	"	"	"
1 Manual Phalanx (2) Frag. Only 156720	"	"cf. small bird"	-	"	"	"
1 Bone Frag. Only 156721	"	"cf. bird"	-	"	"	"
1 Ulna Only 156722	15-23 Mch 1973	"cf. Pterodroma phaeopygia"	-	"	"	"
1 Tibiotarsus Frag. Only 156723	"	"cf. medium procellariid"	-	"	"	"
1 Coracoid Frag. Only 156724	"	"cf. small non-passeriform"	-	"	"	"
1 Pedal Phalanx Only 156725	"	"small bird"	-	"	"	"
1 Manual Phalanx Only 156726	"	"medium bird"	-	"	"	"
1 Manual Phalanx Frag. Only 156727	"	"	-	"	"	"
1 Pedal Phalanx Only 156728	15-23 Mch 1973	"medium bird"	-	1973	A. Sinoto et al.	2.5 km N. Barber's Point, 32 m. b.s. Mus. Arch. Grid CCE/CCN.
1 Pedal Phalanx Only 156729	"	"	-	"	"	"
1 Pedal Phalanx Only 156730	"	"	-	"	"	"
1 Pedal Phalanx Frag. Only 156731	"	"	-	"	"	"
1 Lot of 3 Bone Frag. Only 156732	"	"cf. bird"	-	"	"	"
1 Pterom. Tibiotarsus Only 156733	15-23 Mch 1973	"Pterodroma phaeopygia"	-	"	"	2.5 km N. Barber's Point, 32 m. b.s. Mus. Arch. Grid CCE/CCN.
1 Pterom. Tibiotarsus Only 156734	"	"	-	"	"	"
1 Humerus Only 156735	"	"cf. Pterodroma phaeopygia"	-	"	"	"
1 Humerus Only 156736	"	"	-	"	"	"
1 Ulna Only 156737	"	"	-	"	"	"

ACC'N NO. .... DATE OF ENTRY 21 Apr. 1979 ENTERED BY C. H. Kishinami

GENERAL LOCALITY Hawaii: O'ahu

BBM- X	ORIG. NO.	IDENTIFICATION	SEX	DATE	COLLECTOR	EXACT LOCALITY
1 Radius Only 156738	T.S. 1 O.B. screen	"cf. <i>Pterodroma phaeopygia</i> "	---	15-23 Mar 1979	A. Sinoto et al.	2.25 km. N Barber's Point, 32 m. B.S. Mus. Arch. Grid 100E/CON.
1 Radius Only 156739	"	"	---	"	"	"
1 Carpometacarpus Only 156740	"	"	---	"	"	"
1 Carpometacarpus Only 156741	"	"	---	"	"	"
1 Femur Only 156742	"	"	---	"	"	"
1 Tarso-metatarsus Frag. Only 156743	"	"	---	"	"	"
1 Tibiotarsus Frag. Only 156744	"	"cf. small passeriform"	---	"	"	"
1 Coracoid Only 156745	"	"medium passeriform"	---	"	"	"
1 Radius Frag. Only 156746	"	"medium bird"	---	"	"	"
1 Innominate Frag. Only 156747	"	"	---	"	"	"
1 Rib Only 156748	T.S. 1 O.B. screen	"medium bird"	---	15-23 Mar 1979	A. Sinoto et al.	2.25 km. N Barber's Point, 32 m. B.S. Mus. Arch. Grid 100E/CON.
1 Rib Only 156749	"	"	---	"	"	"
1 Rib Only 156750	"	"	---	"	"	"
1 Furcula(?) Frag. Only 156751	"	"cf. medium bird"	---	"	"	"
1 Lot of 5 Bone Frags. Only 156752	"	"cf. bird"	---	"	"	"
1 Total Phalanx Only 156753	T.S. 1 Lower I screen	"small bird"	---	"	"	"
1 Manual Phalanx Only 156754	"	"medium bird"	---	"	"	"
1 Lot of 5 Bone Frags. Only 156755	"	"cf. bird"	---	"	"	"
1 Cranium Frag. Only 156756	T.S. 8 Surface	" <i>Nycticorax nycticorax</i> "	---	"	"	2.25 km. N Barber's Point, 32 m. B.S. Mus. Arch. Grid 200E/CON.
1 Cranium Frag. Only 156757	"	"	---	"	"	"
1 Jugal Only 156758	T.S. 8 Surface	" <i>Nycticorax nycticorax</i> "	---	15-23 Mar 1979	A. Sinoto et al.	2.25 km. N Barber's Point, 32 m. B.S. Mus. Arch. Grid 200E/CON.
1 Mandible Frag. Only 156759	"	"	---	"	"	"
1 Humerus Only 156760	"	"	---	"	"	"
1 Humerus Only 156761	"	"	---	"	"	"
1 Ulna Only 156762	"	"	---	"	"	"
1 Ulna Only 156763	"	"	---	"	"	"
1 Radius Only 156764	"	"	---	"	"	"
1 Radius Only 156765	"	"	---	"	"	"
1 Carpometacarpus Only 156766	"	"	---	"	"	"
1 Manual Phalanx Only 156767	"	"	---	"	"	"

## NUMERICAL CATALOG-VERTEBRATES

Bernice P. Bishop Museum -90-  
Honolulu, Hawaii

ACC'N NO. DATE OF ENTRY 21 Apr. 1979 ENTERED BY C. H. Kishinami

GENERAL LOCALITY Hawaii: O'ahu

BBM- X	ORIG. NO.	IDENTIFICATION	SEX	DATE	COLLECTOR	EXACT LOCALITY
1 Femur Only 156768	T.S. 8 surface	"Nycticorax nycticorax"	—	15-23 Mch. 1979	A. Sinoto et al.	2.2 km. N Barber's Print, 32 m., Bis. Mus. Arch. Grid 200E/100N.
1 Femur Only 156769	"	"	—	"	"	"
1 Tibiotarsus Frag. Only 156770	"	"	—	"	"	"
1 Tarsometatarsus Only 156771	"	"	—	"	"	"
1 Metatarsus Only 156772	"	"	—	"	"	"
1 Pedal Phalanx Only 156773	"	"	—	"	"	"
1 Pedal Phalanx Only 156774	"	"	—	"	"	"
1 Pedal Phalanx Only 156775	"	"	—	"	"	"
1 Pedal Phalanx Only 156776	"	"	—	"	"	"
1 Pedal Phalanx Only 156777	"	"	—	"	"	"
1 Pedal Phalanx Frag. Only 156778	T.S. 8 surface	"Nycticorax nycticorax"	—	15-23 Mch. 1979	A. Sinoto et al.	2.2 km. N Barber's Print, 32 m., Bis. Mus. Arch. Grid 200E/100N.
1 Sternum Only 156779	"	"	—	"	"	"
1 Pelvis Only 156780	"	"	—	"	"	"
1 Groundsle Only 156781	T.S. 13 D.B. screen	"small bird"	—	"	"	2.2 km. N Barber's Print, 32 m., Bis. Mus. Arch. Grid 200E/100N.
1 Vert. Only 156782	"	"	—	"	"	"
1 Radius Frag. Only 156783	"	"medium bird"	—	"	"	"
1 Radius Frag. Only 156784	"	"	—	"	"	"
1 Radius Frag. Only 156785	"	"	—	"	"	"
1 Radius Frag. Only 156786	"	"	—	"	"	"
1 Femur Frag. Only 156787	"	"	—	"	"	"
1 Ulna Frag. Only 156788	T.S. 13 D.B. screen	"medium bird"	—	15-23 Mch. 1979	A. Sinoto et al.	2.2 km. N Barber's Print, 32 m., Bis. Mus. Arch. Grid 200E/100N.
1 Vert. Frag. Only 156789	"	"	—	"	"	"
1 Lot of 7 Bone Frags. Only 156790	"	"cf. bird"	—	"	"	"
1 Coracoid Only 156791	T.S. 7 layer screen	"cf. Pterodroma phaeopygia"	—	"	"	2.2 km. N Barber's Print, 32 m., Bis. Mus. Arch. Grid 200E/100N.
1 Tarsometatarsus Frag. Only 156792	"	"medium passeriform"	—	"	"	"
1 Radius Frag. Only 156793	"	"medium bird"	—	"	"	"
1 Lot of 10 Bone Frags. Only 156794	"	"cf. bird"	—	"	"	"
1 Sternum Only 156795	T.S. 16 surface	"Streptopelia chinensis"	—	"	"	"
1 Femur Only 156796	"	"cf. medium procellariid"	—	"	"	"
1 Humerus Frag. Only 156797	T.S. 8 surface	"medium bird"	—	"	"	2.2 km. N Barber's Print, 32 m., Bis. Mus. Arch. Grid 100W/100N.

ACC'N NO. .... DATE OF ENTRY 21 Apr. 1979 ENTERED BY C.H. Kishinami

GENERAL LOCALITY Hawaii: O'ahu

BBM- X	ORIG. NO.	IDENTIFICATION	SEX	DATE	COLLECTOR	EXACT LOCALITY
1 Ultra Frag Only 156798	T.S. 8 surface	"medium bird"	-	15-23 Mch 1979	A. Sinoto et al.	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 100W/100N
1 Radius Only 156799	"	"	-	"	"	"
1 Vert. Only 156800	T.S. 33 r.B. screen	"small bird"	-	"	"	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 100W/100N
1 Vert. Frag. Only 156801	"	"	-	"	"	"
1 Lot of 9 Bone 156802	Frag. Only	"cf. bird"	-	"	"	"
1 Ultra Only 156803	T.S. 10 surface	"cf. Pterodroma phaeopygia"	-	"	"	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 100W/100N
1 Ultra Only 156804	"	"	-	"	"	"
1 Ultra Only 156805	T.S. 24 r.B. screen	"cf. Pluvialis dominica"	-	"	"	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 200W/100N
1 Lot of 4 Bone 156806	Frag. Only	"cf. bird"	-	"	"	"
1 Lot of 6 Bone 156807	Frag. Only T.S. 28 r.B. screen	"	-	"	"	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 200W/100N
1 Coracoid Frag. Only 156808	T.S. 32 Lower I section	"cf. medium praeclariid"	-	15-23 Mch 1979	A. Sinoto et al.	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 200W/100N
1 Tarsometatarsus Frag. Only 156809	"	"cf. small passeriform"	-	"	"	"
1 Coracoid Frag. Only 156810	"	"medium passeriform"	-	"	"	"
1 Ungual Phalanx Only 156811	"	"small bird"	-	"	"	"
1 Pterygoid (?) Only 156812	"	"cf. small bird"	-	"	"	"
1 Jugal Frag. Only 156813	"	"medium bird"	-	"	"	"
1 Mandible Frag. Only 156814	"	"	-	"	"	"
1 Radius Frag. Only 156815	"	"	-	"	"	"
1 Manual Phalanx Only 156816	"	"	-	"	"	"
1 Manual Phalanx Only 156817	"	"	-	"	"	"
1 Ungual Phalanx Only 156818	1st Only T.S. 32 Lower I section	"medium bird"	-	15-23 Mch 1979	A. Sinoto et al.	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 200W/100N
1 Vert. Frag. Only 156819	"	"	-	"	"	"
1 Vert. Frag. Only 156820	"	"	-	"	"	"
1 Ungual Phalanx Only 156821	"	"large bird"	-	"	"	"
1 Ungual Phalanx Only 156822	"	"	-	"	"	"
1 Lot of 21 Bone 156823	Frag. Only	"cf. bird"	-	"	"	"
1 Lot of 4 Bone 156824	Frag. Only T.S. 4 r.B. screen	"	-	"	"	2.2 ± km. N Barber's Point, 33 m., Bis. Mus. Arch. Grid 300W/100N
1 Pterygoid Only 156825	T.S. 4 Lower I section	"medium bird"	-	"	"	"
1 Pterygoid Only 156826	"	"	-	"	"	"
1 Lot of 9 Bone 156827	Frag. Only	"cf. bird"	-	"	"	"

ACC'N NO. .... DATE OF ENTRY 21 Apr. 1979 ENTERED BY C. H. Kishinami  
GENERAL LOCALITY Hawaii: Oahu

BBM- X	ORIG. NO.	IDENTIFICATION	SEX	DATE	COLLECTOR	EXACT LOCALITY
1 Ceratoid Frag. Only 156828	T.S. 4 Layer II screen	"cf. medium procellariid"	—	15-23 May 1979	A. Sinoto et al.	2.2 km N Barber's Point, 32m, Bis. Mus. Arch. Grid 300W/100N
1 Bone Frag. Only 156829	"	"cf. bird"	—	"	"	"
1 Coracoid Only 156830	T.S. 4 Layer II screen	"Pterodroma phaeopygia"	—	"	"	"
1 Coracoid Frag. Only 156831	"	"cf. medium procellariid"	—	"	"	"
1 Mandible Frag. Only 156832	"	"medium bird"	—	"	"	"
1 Coracoid Frag. Only 156833	"	"	—	"	"	"
1 Ulna Frag. Only 156834	"	"	—	"	"	"
1 Cuneiform Only 156835	"	"	—	"	"	"
1 Synsacrum Frag. Only 156836	"	"	—	"	"	"
1 Vert. Frag. Only 156837	"	"	—	"	"	"
1 Vert. Frag. Only 156838	T.S. 4 Layer II screen	"medium bird"	—	15-23 May 1979	A. Sinoto et al.	2.2 km N Barber's Point, 32m, Bis. Mus. Arch. Grid 300W/100N
1 Vert. Frag. Only 156839	"	"	—	"	"	"
1 Vert. Frag. Only 156840	"	"	—	"	"	"
1 Rib Frag. Only 156841	"	"	—	"	"	"
1 Lot of 10 Bone Frag. Only 156842	"	"cf. bird"	—	"	"	"
1 Bone Frag. Only 156843	T.S. 6 Layer I screen	"	—	"	"	2.2 km N Barber's Point, 32m, Bis. Mus. Arch. Grid 300W/100N
1 Pedal Phalanx Frag. Only 156844	"	"medium bird"	—	"	"	"
1 Humerus Only 156845	T.S. 3 surface	"cf. Pterodroma phaeopygia"	—	"	"	2.2 km N Barber's Point, 32m, Bis. Mus. Arch. Grid 300W/100N
1 Humerus Only 156846	"	"	—	"	"	"
1 Humerus Only 156847	"	"	—	"	"	"
1 Ulna Only 156848	T.S. 3 surface	"cf. Pterodroma phaeopygia"	—	15-23 May 1979	A. Sinoto et al.	2.2 km N Barber's Point, 32m, Bis. Mus. Arch. Grid 300W/100N
1 Ulna Only 156849	"	"	—	"	"	"
1 Carpometacarpus Frag. Only 156850	"	"cf. medium procellariid"	—	"	"	"
1 Femur Only 156851	"	"medium bird"	—	"	"	"
1 Pedal Phalanx Only 156852	T.S. 1 N.B. screen	"	—	"	"	2.2 km N Barber's Point, 32m, Bis. Mus. Arch. Grid 300W/100N
1 Coracoid Only 156853	T.S. 1 Layer I screen	"Pterodroma phaeopygia"	—	"	"	"
1 Coracoid Only 156854	"	"	—	"	"	"
1 Isosoma (Ischium) Frag. Only 156855	"	"	—	"	"	"
1 Ulna Frag. Only 156856	"	"cf. medium procellariid"	—	"	"	"
1 Radius Frag. Only 156857	"	"	—	"	"	"

ACC'N No. .... DATE OF ENTRY 21 Apr. 1979 ENTERED BY C. H. Kishinami.

GENERAL LOCALITY Hawaii: Oahu

BBM-X	ORIG. No.	IDENTIFICATION	SEX	DATE	COLLECTOR	EXACT LOCALITY
1 Tibiotarsus Frag. Only 156858	T.S. 1 Layer I screen	"cf. medium procellariid"	-	15-23 Mch 1977	A. Sinoto et al.	2.2 km N Barber's Point, 32 m, Bis. Mus. Arch. Grid 400W/100N.
1 Cranium Frag. Only 156859	"	"cf. small passeriform"	-	"	"	"
1 Femur Frag. Only 156860	"	"	-	"	"	"
1 Tarsometatarsus Frag. Only 156861	"	"	-	"	"	"
1 Vert. Frag. Only 156862	"	"small bird"	-	"	"	"
1 Furcula Frag. Only 156863	"	"medium bird"	-	"	"	"
1 Furcula Frag. Only 156864	"	"	-	"	"	"
1 Furcula Frag. Only 156865	"	"	-	"	"	"
1 Furcula Frag. Only 156866	"	"	-	"	"	"
1 Ulna Frag. Only 156867	"	"	-	"	"	"
1 Manual Phalanx Only 156868	T.S. 1 Layer I screen	"medium bird"	-	15-23 Mch 1979	A. Sinoto et al.	2.2 km N Barber's Point, 32 m, Bis. Mus. Arch. Grid 400W/100N.
1 Manual Phalanx Frag. Only 156869	"	"	-	"	"	"
1 Innominate Frag. Only 156870	"	"	-	"	"	"
1 Tibiotarsus Frag. Only 156871	"	"	-	"	"	"
1 Tarsometatarsus Frag. Only 156872	"	"	-	"	"	"
1 Pedal Phalanx Only 156873	"	"	-	"	"	"
1 Pedal Phalanx Only 156874	"	"	-	"	"	"
1 Ungual Phalanx Only 156875	"	"	-	"	"	"
1 Syntarsus Frag. Only 156876	"	"	-	"	"	"
1 Vert. Only 156877	"	"	-	"	"	"
1 Vert. Frag. Only 156878	T.S. 1 Layer I screen	"medium bird"	-	15-23 Mch 1979	A. Sinoto et al.	2.2 km N Barber's Point, 32 m, Bis. Mus. Arch. Grid 400W/100N.
1 Rib Frag. Only 156879	"	"	-	"	"	"
1 Rib Frag. Only 156880	"	"	-	"	"	"
1 Rib Frag. Only 156881	"	"	-	"	"	"
1 Pterygoid (P) Only 156882	"	"cf. medium bird"	-	"	"	"
1 Lat. 31 P. Frag. Only 156883	"	"cf. bird"	-	"	"	"
1 Coracoid (C) Only 156884	T.S. 22 Layer I screen	"cf. medium procellariid"	-	"	"	2.2 km N Barber's Point, 32 m, Bis. Mus. Arch. Grid 400W/100N.
1 Quadratus Frag. Only 156885	"	"medium bird"	-	"	"	"
1 Pedal Phalanx Only 156886	"	"	-	"	"	"
1 Pedal Phalanx Only 156887	"	"	-	"	"	"
1 Lat. 31 Bone Frag. Only 156888	T.S. 22 Layer I screen	"cf. bird"	-	15-23 Mch 1979	A. Sinoto et al.	2.2 km N Barber's Point, 32 m, Bis. Mus. Arch. Grid 400W/100N.

APPENDIX III  
A BRIEF COMPARATIVE COMMENTARY ON  
PREVIOUS STUDIES  
BY ARCH\* AND BISHOP MUSEUM

Subsequent to the initial Barbers Point Cultural Resources Survey in 1976 and the ensuing Archaeological and Paleontological Salvage in 1977, both conducted under contract to the U.S. Army Engineer District, Honolulu, by Bernice Pauahi Bishop Museum; Archaeological Research Center Hawai'i (ARCH) conducted an extensive archaeological survey under contract to the Department of Transportation, State of Hawai'i. This survey completed in 1978, also included portions of areas previously surveyed by Bishop Museum. When their report was submitted, several questions arose from the various readers regarding the apparent differences between the Bishop Museum reports and that of ARCH.

This paper is not intended as a review of these reports, but rather as a brief and general comparative overview and clarification of the contrasting methodologies utilized and the resultant findings presented in the reports.

The major difference apparent in the Bishop Museum and ARCH reports is the basic methodological framework which in both cases dictate the research strategy, manner of data recovery, emphases on specific topics, and perhaps most strongly influences the resulting interpretations.

The manner in which a set of problems is initially introduced and the formulation of a research design to address these queries is similar in all of the reports. From this point on, however, the subjects of emphases diverge.

\*Archaeological Research Center Hawai'i

The Bishop Museum reports (Sinoto, Ms.a:1976 and Ms.b:1978) are based primarily on an objective format, with emphasis on description. The level of interpretations formulated is dependent upon the amounts and types of data recovered through progressively more intensive levels of investigations. Consequently, only preliminary kinds of interpretations are presented subsequent to a reconnaissance of an extensive survey phase, whereas more specific and conclusive interpretations are contingent upon the results of intensive investigations. The more generalistic and holistic type of interpretations and commentary on the prehistory of an area are viewed as appropriate only after an intensive study, preferably with multi-disciplinary support, encompassing the whole area in question. There exists, at Barbers Point, a limitation very relevant to this point which is recognized and discussed in both the ARCH and Bishop Museum reports. That is the extensive destruction of the surrounding areas as well as portions of the study area which render determinations of the original (prehistoric) extent and integration of the presently sited areas extremely difficult. At best, modern archaeologists are left to work with only a partial record in his attempt to obtain the shared goal of comprehending the prehistory of the area.

The ARCH report (Davis and Griffin, Ms.:1978) attempts to approach the problems set forth from a theoretical perspective. The inductive framework of the report depends at times on inferred parameters of a site obtained by manipulating surface data, such as morphological traits and metric analysis. In this case the manner in which some of the problems are approached contrasts the methodological framework of the Bishop Museum reports because hypothetical interpretations are presented initially

followed only by a recommendation of steps to determine the validity of these postulations. At this point, no attempt is made to substantiate these interpretations through correlation with subsurface data. The underlying format here is that these inferences will be reexamined following the implementation of testing procedures and more intensive excavation during the ensuing phases of work. However, this presumed continuity may not be expressly apparent, especially to those outside the field of archaeology. Thus, the interpretations set forth hypothetically in the preliminary report may possibly be misleading (i.e. misinterpreted to be conclusive, final kinds of interpretations).

An examination of the functional classification established in the ARCH report will serve to illustrate the preceding points. Four major functional classes of surface structural features are postulated based on morphological trait analysis and metric analysis of the relative total and interior floor areas (Davis and Griffin, Ms.1978:xvi-xvii). These are sound and often practiced kinds of analysis. However the application of these tentative functional classes in further analysis and interpretations, such as the designation of clusters incorporating functionally associated features, presented in the report are, in this writer's opinion, open to criticism in view of the preliminary level of investigation undertaken by ARCH.

In developing such classifications, several key elements are necessary:

- 1) substantiation of contemporaneity among "functionally associated" features,
- 2) the recovery of supportive subsurface data which correlates with the functions attributed to the features.

In the ARCH reports, these elements are lacking or, in view of their format, the necessary continuity into ensuing phases of work is understated. At the same time, the uniqueness of the environment should be considered with the possibility that available data from other areas in Hawai'i may not in fact be effectively applicable or even appropriate to the situation at Barbers Point.

Archaeology in Hawai'i is still a relatively new field and many avenues of research are still left untravelled. Although the methodologies may be markedly different, similar underlying goals are and will be convergent towards the better understanding of the prehistory of a given area. Hopefully with more effective coordination and and willful cooperation the accumulation of data and knowlege will accelerate towards the better understanding of the prehistory of Barbers Point and other areas in Hawai'i.

The professional archaeologist has, in addition, an obligation to not lose sight of his responsibility to communicate and share his findings and ideas with others, especially those in the public domain.